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PERSONAL COMPUTER WORLD SHOW PREVIEW

Sinclair slashes QL price in half

SINCLAIR has slashed the price of its QL micro down from £399 to £199 95

The new price comes into effect from September 2

Jane Boothroyd, Sinclair's UK sales and marketing manager, said, "We have reduced the price of the QL to consumers in line with reduced manufacturing costs We will achieve major savings from our substantially increased manufacturing volume, based on sales commitments received to date and more in the pipeline "

The QL price reduction comes just two days after Amstrad formally unveiled its disc-based 6128 and PCW 8256 machines at £399 and £459, respectively Following the QL price drop the combined price of the QL and 3½ inch disc add-on comes down to £488 95

The move not only re-establishes Sinclair's claim that the QL is a true low-cost business machine but could also pave the way for a new QL based model (see *Popular Computing Weekly*, August 22).

Since its launch in January

continued on page 4 ▶

CPC 664 is now "truly dead"

AMSTRAD has now officially announced it is to drop its CPC 664 disc based micro

With the 128K version—the CPC 6128—already in the shops, and the new PCW 8256 launched last week (see *Popular Computing Weekly* August 22) Alan Sugar, Amstrad's chairman and managing director said "The 664 is now well and truly dead.

"It was a natural progression from the 464, but it suffered from a leap in micro technology "

As the 6128 is to sell for £399 (colour) and £299 (monochrome) the prices of the 464 model have been cut to match The colour monitor version of the 464 comes down from £349 to £299 and the monochrome monitor version comes down from £239 to £199

The new desk-top word processing mod-

cont on page 4 ▶

NEW AMSTRAD 8256 EXPOSED



All-in-one micro, disc, monitor and printer



NIGHTSHADE, Ultimate's long awaited Spectrum title has now been released It features 'Filmation 2', said to be an enhancement of the 3D system featured in Knight Lore and Alien 8.

Played in a background of tudor houses, archways and other buildings the game involves finding four special weapons and using them to kill four specific monsters The game – very much in the arcade mould – is priced at £9 95



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Show time For a preview [illegible] see page 5

EDITORIAL

This time next week the 1985 *Personal Computer World* Show will be in full swing. Over the last eight years the show has emerged to become the number one showcase for the industry's new products.

In fact most companies have been working round the clock to get previews and demo versions ready of the new hardware and software intended for sale at Christmas.

It is strange – given the prevailing climate of doom and gloom in some quarters of the micro world – but this year's show promises to be the most exciting in four years.

In contrast with last year's show it looks very unpredictable with possibly more than nine new micros being shown for the first time.

The biggest question marks will be hanging over the Sinclair stand. The company has in recent weeks struggled through a severe cash crisis to emerge perhaps bearing not one but two new computers. From Sinclair's point of view the *PCW* Show will give the first indications of whether the new products – expected to be new Spectrum and QL derived machines – will capture the imagination of the public the way the Spectrum did in 1982. Sinclair needs to make a big success of the show.

Other stars expected to be shown include Atari's strong contender the 260 STD – for the first time in public. And Amstrad will show its price-busting PCW 8256 – also for the first time – together with the 6128.

It's not just the micros that *will* be there that are interesting. There may be a number of significant omissions. It seems doubtful that Acorn, for example, will launch its successor for the BBC micro at the show. And strangely, Commodore seems to be pinning all its hopes for this year on the new rather overpriced C128 when the machine everyone wants to see is the Amiga. The Amiga, launched in a blaze of publicity in the US last month, is apparently not being shown in public for fear it would overshadow the C128. A wise decision – it would.

This *PCW* Show is the most important for five years – it will show the direction that all the major manufacturers will be taking over the next crucial eighteen months. Success or failure.

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Computer Trade Association Magazine of the Year

Acorn claims world first for new chip

ACORN is claiming a world first with the announcement of the first production models of a revolutionary 32-bit microprocessor

Acorn has beaten a number of major chip companies to be the first to produce what is termed an RISC processor chip

RISC stands for Reduced Instruction Set Computer technology—as opposed to CISC (Complex Instruction Set) which most chips up until now have been based on Making the chip's instruction simpler increases the speed at which it can operate Prototypes of the Acorn RISC device can handle up to 3m instructions per second

"RISC is nothing new as a theory," explained Mark Carrington, marketing analyst at Acorn's Business division "Research into RISC architecture has been going on at Stanford and Berkeley Universities and also IBM's Yorktown Heights research centre in the US"

Acorn however is the first company to put such a chip into production. Development was completed by a team of VLSI (very large scale integration) technology engineers who joined Acorn shortly after its first reshuffle in February this year

Acorn's 32-bit RISC chip will now be developed further internally, before being used in machines It would theoretically be suitable for implementation in the recently launched Cambridge Workstation, but Mark Carrington would not comment on whether such a move was planned

Ex-Quicksilva chief to launch new label in September

ROD COUSENS, ex-managing director of Quicksilva, and former vice-chairman of the Guild of Software Houses has set up his own new software company

Called Electric Dreams Software, three programs will initially be released, to be previewed at the *Personal Computer World* Show and on sale in October

The first three are *Riddlers Den*, an arcade strategy game for the Spectrum, which will be priced at £7 95, *I of the Mask* for the Spectrum (£9 95), which is being written by *Ant Attack* author Sandy White and features advanced 3D graphics, and a sports simulation for Spectrum and Amstrad at £8 95

"We have been set up as a division of Activision" Rod explained but we are based

Rod Cousens   Sandy White

in Southampton, and will be quite autonomous, doing our own marketing and so on It is possible we may be able to export our programs to the States through Activision US

"There are some Commodore titles also in development, and we plan to respond closely to the market – so we may not necessarily be just a games house

Spectrum Elite has novel protection

FIREBIRD'S version of *Elite* for the Spectrum – now scheduled for late September – will be the first commercial product to use Lenslok, a new anti-piracy device

Each copy of *Elite* will be packaged with a special Lenslok lens which acts as an on-screen 'unscrambler'

Before playing a game of *Elite*, the program will randomly generate two figures the matrix of which has been scrambled The user will only be able to see the two characters by looking at the screen through the Lenslok lens, which alters the refraction from the screen. The user must then type in the two characters, and only if they are correct will the game proceed.

Tony Rainbird of Firebird said, "We are also planning to use Lenslok on *Booty* for the QL It seems particularly important to protect QL programs in this way, since you need to make a back-up microdrive so any device which prevents audio copies is no good

"However, we haven't committed ourselves to putting Lenslok on all our titles – we'll see how *Elite* on the Spectrum goes first"

Lenslok

The manufacturer of Lenslok, ASAP Developments, has also had discussions with Ocean, US Gold, Ultimate and Acornsoft

New printer for Amstrad

AMSTRAD has announced a new printer to be used with both the 464 664, and the new 6128 micro

The new dot-matrix model – the DMP 2000 – prints at 105 cps (characters per second), and takes both single sheet and continuous feed paper

The printer will also operate with any micro which uses a standard Centronics parallel interface It will be available in October and costs £159 95

PCW 8256

continued from page 1

el, the PCW 8256 will be available in Dixon's and a large number of independent stores in September, at £458 85 It will also be available then through office equipment distributors, directly to companies

Up until the end of December, Dixons will have "an element of exclusivity" according to Alan Sugar, being the only high street chain to stock the machine From the beginning of next year, the PCW 8256 will be available in other high street stores By then Amstrad will be able to produce enough PCW machines to keep up with demand

Amstrad claims to have sold 200,000 computers in 1984 worldwide and is aiming for 800 000 in 1985

QL cuts

continued from page 1

1984 sales of the QL have been disappointing Early teething problems did little to help the machine and so far world-wide sales have only reached around 60,000

Recently the machine has suffered heavy discounting in some stores to clear stocks

Sinclair continued discussions with its major creditors throughout last week, although so far the terms of repayment to creditors remain unchanged.

The major creditors are Thorn-EMI, Timex, AB Electronics, Barclays Bank and Citibank

The talks, which are expected to reach a conclusion within the next two weeks, were described as an "ongoing confidence building exercise" by a Sinclair spokesman

Showing off

Christine Erskine *looks at what's likely to be on offer at next week's* PCW *show*

This year's *Personal Computer World* Show — the eighth, which runs from September 4-8 at Olympia in West London, promises to be very exciting

Most of the home orientated companies will have stands in the National Hall, Olympia, with business firms generally in Olympia 2

Sinclair Research is widely expected to show some new products, and to put on a convincing display that its troubles of the last months are over It seems likely that an expanded memory version of the Spectrum will be shown, possibly a 512K version of the QL, and maybe even a glimpse of Pandora, the Spectrum portable A QL mouse is in the offing, too

Sinclair is keeping quiet about its plans for the show and will only confirm that all its existing products will be there, plus the latest software for the QL.

520 ST – at last

Atari will be taking a large stand to accomodate around 50 third party software houses showing ST programs The show will mark the first public showing of the 520ST in this country and Atari has also promised the first view of the 260STD with built-in disc drive and its compact disc Rom data storage system

The show should mark the beginning of genuine availability of the 520ST in the shops, as Atari builds up its production capacity The 260STD is still expected to reach the shops before the end of the year and Atari is hoping the CD Rom Player — a first for a home system — will be out by Christmas.

Amstrad will be showing its full complement of micros The new PCW 8256 will get its first public showing, and Amstrad will also be highlighting the business capabilities of the 6128 The 664, though it will be there, will be taking very much a back seat

Commodore is dividing its stand in two — music featured strongly on one side and the new C128 on the other

Music software on show includes *Music Maker 64*, and the new *Music Maker 128 Sound Sampler Sound Expander* — which gives the C64 eleven voices — and the full range of Playalong albums, all from Music Sales

The C128 will be shown with software running — from Commodore itself comes a word processor (a modified version of Precision's *Superscript) Microclerk*, an accounting package *Personal Money Management* and two games, *Mandroids* and *Pazazz*

Some CP/M software should also be up and running on the C128, and Commodore is also, like Atari, giving space to third party companies CP/M distributors Softworld, utility house Vizasoft, educationalists ASK and again Music Sales will all be there

All the new peripherals running with the C128 will be shown the 80-column monitor, the 1571 disc drive and the mouse controller

For reasons best known to itself, however, Commodore has decided not to show the exciting new Amiga model in public Commodore seems to be worried that it would overshadow the C128

Commodore claims that the conversion from the US TV standard NTSC to PAL means the Amiga cannot be released over here until January The machine may however be shown to a select audience of retailers and commentators

Toshiba's HX-22 MSX

The MSX manufacturers will all be represented on one MSX stand A number of enhanced MSX machines featuring 128K video Ram, with a up its sleeve, although interestingly, only 128K models will be shown A new colour monitor will be shown for the first time, as will the Enterprise mouse, commissioned from Aztec Software at £49 95 The main emphasis will be on its disc controller (£99)

'This will connect any $3\frac{1}{2}$ inch or $5\frac{1}{4}$ inch drive to the Enterprise It will also give file compatibility with MS DOS and full CP/M compatibility,' said product manager Steven Gandy.

The company is also hoping to be able to show 60 software titles, including an original Enterprise adventure, *The Seventh Seal* which runs on the 128K machine

Acorn is fully expected to unveil the Communicator its answer to ICL's One Per Desk, with built-in telephone / modem and software The Cambridge Workstation, 32016 second processor for the BBC and the BBC B Plus will also be exhibited It is unlikely, though, that it will be ready to preview its BBC B Plus successor in time

Spectrum *Elite*

The *PCW* Show is the time when many software houses reveal their Christmas releases, whether in prototype or finished form

Beyond has promised that *Superman* will fly for the first time in this country at the show, and *Eye of the Moon* and *Enigmaforce (Shadow-Fire II) Nexus* and *Iron Heroes* should also be making their debut.

Ocean will be previewing its version of fun-loving Sylvester Stallone's *Rambo First Blood Part II*, *Transformers* and *Knight Rider*

US Gold is planning to link its booth up with Ocean's to create one mega-stand, and show for the first time in Britain a prototype of Epyx's *Winter Games*, Datasoft's movie tie-up *Goonies* and the licensed Disney titles *Summer Games II* will also be a sure-fire crowd puller

Also bound to be attracting the crowds is Methourne House, with the first part of *Lord of the Rings*, which

Mega-stand

should reach the shops this autumn Three separate *Lord of the Rings* adventures will eventually be released, corresponding to the parts of Tolkien's trilogy *Terrormolinos* — the package holiday spoof from the authors of *Hampstead* — is also being launched

Firebird has found space on its stand to allow British Telecom's implementation of MUD to run throughout the show, while Firebird itself will be showing *Elite* on the Spectrum for the first time

Level 9 has a new adventure to preview — *Worm in Paradise* Not an 'easy' one like *Red Moon* or *Emerald Isle*, this completes the *Snowball/Return to Eden* trilogy, will cost £9 95, and will be available for most micros

Metacomco will launch a C implementation for the QL to round up its highly acclaimed language range for that machine, and also show an Assembler/Editor for the Atari 520ST Sadly, Metacomco will not be displaying its Amiga software

Mirrorsoft will have its *Spitfire 40* conversion for the Spectrum on show, and also *Ninja*, a martial arts arcade title

Psion, whose name has been linked with so many quality Sinclair products at *PCW* Shows past, is concentrating far more on its Organiser pocket micro this year, and showing *Xchange* its suite for business machines There is still no sign of Flight its long running flight simulation project for the QL

Letters

Speculative

Congratulations on a fair review of the 6128 on the whole this was very good, except for one or two small inaccuracies

I am sure the comment about the spare ULA socket is going to fuel quite an amount of speculation. Unfortunately it is nowhere near as exciting as the review may have suggested. In production, we use two different manufacturers ULA chips each of which have slightly different external clock circuitry and driver chips – for this reason, two ULA sockets are provided on the board.

The new CP/M on the machine is Plus (3 0), not 3 1

Pip has not been re-written in any way – it is absolutely standard

The facility that allows the single drive to be treated as both A and B is buried deep within the BIOS so that any application program that would usually require two drives may be used (though there may be a lot of tedious disc changes) For example try typing *Dir B* on a single drive system.

Cliff Lawson
Software Engineer
Amsoft
Brentwood House
169 Kings Road
Brentwood

Just a joke

How dare you say in your review of *Beatles Quest* that the Beatles were nearly as famous as Duran Duran!

Duran Duran have been making records for about six years During that time the Beatles 1) sold over 150m records, 2) had 10 consecutive No 1 hit singles, 3) eight consecutive No 1 LPs, 4) made three feature films Has Duran Duran ever done any of this? The answer is no.

Your reviewer should crawl back into the slime-pit from which he came You've just lost one of your readers I would rather read *Woman's Own*

K J Walker
103 Ribble Road
Blackpool

It was a joke . . . honest. What we meant to say was that the Beatles were almost as famous as Haircut 100.

Is it RISC capital that Olivetti's injecting into it Dad?

User group

I am interested in contacting users of ACT computers, particularly the Apricot/F1/Portable range, with a view to starting a national user group The idea would be to cover the full range of computing with things of interest to business home and educational users

If anyone would like further details please write to me enclosing an sae

F S Cartwright
Rockside
13 Worley Ridge
Nailsworth
Glos
GL6 0PD

Walkabout line

Whatever happened to Line F860 in Simon Nichols' ZX Basic Code Vol 4 No 33 ends with F858, yet Vol 4 No 34 starts with F868! What is the meaning of this the public have a right to know!

A Hall
Bethnal Green
London E2

I'm afraid that line inadvertently went walkabout between weeks. It has now been recaptured, and we can reveal its contents F860 29 F8 CD 58 F8 2A 0E 5C D2. Our apologies to all frustrated Spectrum users.


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HIGH PERFORMANCE PROGRAMS

And the word was Amstrad

Amstrad means business with the launch of the PCW 8256

***John Cook** investigates the bumper bundle*

Last April, Amstrad Consumer Electronics – headed by Brentwood's answer to Jack Tramiel, Alan Sugar – entered the home computer marketplace with a product called the CPC 464.

Fifteen months and a claimed 200,000 units later, even the harshest of critics would have to grudgingly admit that Amstrad is doing well.

The reasons for that success are simple the simplicity of everything-in-one box and competitive pricing achieved by overseas manufacture

Having now made its mark in the home computer market Amstrad has moved on to try its hand in the lucrative business and office systems market.

Last week it announced the Personal Computer Wordprocessor (PCW) 8256 What you get in the package is a green-screen monitor with built-in disc drive, a professional keyboard 256K of Ram, software, and a printer – all for £459 When Amstrad's Chairman suggests that this machine will "blow the lid off the personal computer and word processing market" he might not be wrong

Hardware

The monitor provided is green screened, displaying 90 columns on 32 text lines The display is crisp and clear as you might expect and a brightness control is situated flush under the right-hand side of the console Built in to the upper right of the unit mounted vertically is the disc drive Amstrad have retained the 3-inch floppy format, giving about 180K of storage on each side after formatting There is space on the lower right of the monitor unit for a second disc drive to be fitted, a 1 Megabyte 3-inch floppy which should provide an extra 720K of formatted storage Available by late November, this would be fitted by a dealer – for the sum of £159

The main circuit board, about the size of an A5 sheet of paper, sits between the television tube and the disc drive towards the rear of the unit The Z80A processor lies at its heart, with 256K of Ram, 112K of which is used as a Ram disc when running software under CP/M There is virtually no on-board Rom, as one Amsoft employee explained, "There's just a short bootstrap and that's it It's a totally clean machine " On the same board are the disc and printer controllers and some interfacing circuitry, plus a novel gate array

The whole monitor/drive unit (which includes the power supply/transformer as in the other Amstrad machines) sits on a small pedestal, slightly reducing its footprint.

The 82-key keyboard has a normal Qwerty layout to the left, and a selection of function keys on the right, which can double as a numerical keypad It has a nice feel to it – light but responsive – and shouldn't give too many problems to the touch typists it is primarily aimed at The whole thing is connected to the monitor via a single spiral-cord connection

Non-standard characters (such as those used in continental languages and scientific notation) can be obtained by simultaneously pressing *Alt* or *Extra*, plus the appropriate key – a useful feature

The printer is manufactured by the established manufacturer Seikosha. It is dot-matrix and seems to perform well. In its letter quality mode (probably a fair description – especially with a good ribbon) it prints at 20 characters per second, increasing to 90 cps in draft quality

When running under CP/M it emulates an Epson, and supports both single sheet and tractor feed operation. You won't be able to use it with your existing computers however The printer is just a printer mechanism, with the printer driver hardware located on the main board It connects to the main computer/display unit via two cables – one power, the other ribbon.

The complete PCW 8256 system

That's the basic set up As well as the disc upgrade mentioned, a combined serial and parallel interface should be available by late September, costing £69 This would allow access, via a modem, to the main electronic mail and information systems, such as BT Gold, plus facilitating the use of serial printers This will be bundled with the suitable operating software

Memory upgrades are technically possible, but Amstrad has no plans to explore that avenue at present

Over 3000 software packages have been written to run under CP/M The following is a selection of key packages which are available for the Amstrad

Utilities

Devpac 80	£39 95
DiscDoctor	£19 95
ED80 (Screen Editor)	£29 95
Microsoft Macro Assembler	£225

Languages

Mallard Basic	£99 00
Nevada Basic	£39 95
Nevada Fortran	£39 95
Nevada Pascal	£47 00
Pascal80	£39 95
Nevada Cobol	£39 95
Nevada Pilot	£39 95

Graphics

Viewspread (Saxon)	£29 95

Financial Modelling

Microspread II	£49 00
Cracker (Software Technology)	£49 00
Supercalc 2	£49 95

Word Processing

NewWord (with Spell Plus)	£149 00
Wordstar	£295 00

Database Management Systems

Cambase Plus	£39 95
DBase II	£395 00

Training Software

Hisoft CP/M Tutorial	£12 95
Touch n Go	£29 00

Software

Any machine that calls itself a wordprocessor must surely rise or fall on the quality of the wordprocessing software supplied with it The PCW 8256 comes with *LocoScript*, a new package written specially for the machine by Locomotive Software Members of the Locomotive development team are no strangers to writing wordprocessors – a number previously had a hand in developing the Diamond system, very much a top-flight machine

The system is genuinely easy to use On booting up (this is just done by turning the machine on and inserting the correct disc) you are presented with the disc management screen (a detailed directory) From there on, documents are

Continued over the page

Amstrad PCW 8256 Specification

Processor Z80A
Ram 256K (32K available to Basic)
Rom. Bootstrap loader only
Disc (built in) Hitachi Format 3 inch
Disc operating system. CP/M Plus
Disc software included. *Loco Script*, CP/M, Dr Logo DR GSX Mallard Basic
Display 90 columns by 32 lines
Colour None
Sound None
Printer Dot matrix 90 cps (90 cps in near letter quality mode)
Price £458

created or edited by using single keystrokes and cursor controls Extensive use is made of window menus, backed up by excellent documentation. Within a few minutes it is possible to produce recognisable results – a major advance on my attempts with other wordprocessing systems

At first glance the *LocoScript* system seems to provide most major facilities you would expect from a professional wordprocessor in an extremely accessible manner

Also bundled with the machine comes the software that accompanies the 6128 – CP/M Plus, DR Logo, GSX, DR's graphics extension package with the addition of Mallard Basic, once again by Locomotive Software

It should be noted that there is no Basic resident within the machine Mallard Basic must be soft loaded The precursor of Locomotive Basic, it offers better filing commands and fewer graphics commands (the 8256 has neither colour nor sound)

CP/M Plus opens up a vast library of software to the potential user – some rather pricy (like *dBase II* weighing in at

LocoScript

a cool £450), others public domain, available from the CP/M User Group When running under CP/M the printer automatically defaults to Epson control codes, and the screen emulates a DEC VT52 This makes software installation very easy Amstrad have set up deals with various companies to ensure that there is a good supply of CP/M software available on their 3 inch format, and have tried to negotiate cheaper versions of 'classic business packages such as *Supercalc*

The version of Basic supplied, Mallard Basic, runs under CP/M and is generally business orientated. Its advanced file handling facilities offer sequential, random access and keyed random access and it is broadly compatible with the most common version of Microsoft Basic When loaded in there is only 32K available for your own Basic programs

The new keyboard layout

The documentation supplied with the software runs to two volumes, totalling around 700 pages but do not be daunted. These are some of the best written manuals I have ever read in terms of clarity and logical progression. Recommended reading for future manual authors

Conclusion

So there you have it Amstrad have taken the basic principles that took the home computer market by storm and applied them to the business sector

A no-nonsense, well presented package, which although it is being put forward as a dedicated wordprocessor, is certainly capable of very much more than that

And the price! We are talking about a monitor / keyboard / printer / software bundle for only a little more than the price of a QL!

Make no mistake, this micro could revolutionise the office and home business computer market The PCW 8256 is, after all, cheaper than a good electronic typewriter

And the multinational business micro giants like IBM and Wang stand a chance of being hit where it hurts most – right in the profit margins At £450 nothing else comes close

Mallard Basic Keywords

Abs Addkey, Addrec, All, And, As, Asc, Atn, Auto
Base Buffers
Call Cdbl Chain, Chr$, Cint Clear, Close, Common Consolidate Cost, Cos Create, Csng Cvd, Cvi, Cvkl Cvs, Cvuk
Data, Dec$, Def, Defdbl, Defint, Def Seg, Defsng, Defstr Delete, Delkey, Dim, Dir, Display
Edit, Else End, Eof, Eqv, Era, Erase Erl, Err, Error Exp
Fetchkey$, Fetchrank, Fetchrec, Field, Files, Find$ Fix Fn, For Fre
Get Gosub, Goto
Hex$ Himem
If, Imp Inkey$ Inp Input, Input # Input$ Inpw Instr, Int
Kill
Left$, Len, Let, Line list, Llist Load Loc, Lock, Lof, Log, Log10, Lower$ Lpos, Lprint Lset
Max, Memory, merge, Mid$ Min Mkd$ Mki$ Mkik$ Mks$ Mkuk$, Mod
Name Next, New Not
Oct$ On, On Error Goto 0, Open, Option, Or, Oserr, Out, Outw
Peek, Poke, Pos, Print, Print #, Put
Randomize, Rankspec, Read, Rem, Ren Renum, Reset, Restore Resume, Resume 0, Return, Right$, Rnd Round, Rset Run
Save Seekkey, Seeknext Seekprev, Seekrank Seekrec, Seekset, Sgn, Sin, Space$, Spc, Sqr Step, Stop, Str$, String$, Strip$, Swap System
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Reviews

Cheap thrill

Program *Cylu* **Micro** Commodore 64 **Price** £2 50 **Supplier** Firebird, Wellington House, Upper St Martin's Lane, London WC2H 9DL

Cylu has to be Firebird's finest budget hour Beyond the single complaint that graphically



it owes rather a lot to Ultimate's *Knight Lore* and *Alien 8*, I can think of nothing else bad to say about it

lising a similar 3D vantage point to *Alien 8*, it depicts a large maze through which, you, as up-ended silicon chip, must trundly your way

Within the maze are a host of useful (and useless) objects which you may collect and use at a later date. The task is to find 24 objects and take them to the Master Computer.

Some sections of the maze are only made available via teleports found in the computer section other sections can only be reached once forcefields have been disabled – again it's a matter of finding the right objects and taking them to the computer

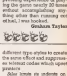
There is one other major difficulty to the game, you must continuously search for fuel – each supply lasts about two minutes so you really don't have time to get things wrong

The graphics, though Ultimatesque, are also abstract, a strange mixture of basic geometrical shapes, crosses, cubes, etc, and odd objects like books, silicon chips and dice Between these objects there are a number of pathways it is mappable but not easy

The only thing the game rather lacks is sound What there is seems a little odd When Cylu walks around you hear the distinctive thud of jackboots rather than the electronic swish you might expect.

Despite having the depressing experience of playing the game nearly 20 times without accomplishing anything other than running out of fuel, I was hooked.

Graham Taylor



Plan ahead

Program *Project Planner* **Micro** QL **Price** £39 95 **Supplier** Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ

Any kind of manager, whether organising flower shows or building houses, will tend to use a technique called Critical Path Analysis – even if they couldn't put a name to it Whatever you're trying to organise, there are likely to be things that can proceed in parallel, and other events which must be completed before a following vital stage can start Critical Path Analysis (CPA) is the name for a simple, yet sophisticated, technique for planning the schedule for any project, however complex.

Trouble is although the basic concepts can be understood and appreciated quite readily, a lot of arithmetic is involved in using CPA effectively. This is where a micro can come in. With a micro many advanced management techniques become accessible to the home user But to apply these well, a good grasp of the principles and theory is needed.

Accordingly *QL Project Planner* contains a textbook and interactive teaching programs As you may expect from Triptych both are very good. The package can safely be recommended to complete beginners, both to computers and CPA. That's user friendly!

You tell the program the activities that comprise the project, tell it what needs to happen before what, and the time each activity will need From this the program produces a chart which highlights the critical activities (whose delay would delay the whole project), and indicates where dawdling can be tolerated Most usefully, activities can be modified, deleted or added while you watch the chart This means you can experiment with 'what if' questions until you are sure your schedule is robust and can cope with the unexpected.

Other reports show the timetabling of the events, both in true date terms and in terms of the time elapsed since the start of the project The true or calendar dates are especially useful for lengthy projects where weekends, bank holidays, and other breaks must be taken into account The early and late start and finish dates are shown for each part of the project together. The program will print all reports to an Epson FX or RX printer

The facility for milestoning is essential for serious use Milestones can be used to indicate activities which cannot start until some external event has happened They can also be used to split up your project should you need to specify more than 60 different activities

Versions of *Decision Maker* have been produced for the BBC, Commodore 64 and Amstrad CPC s The QL version uses an 80 column display, programmes holidays and gives actual calendar dates

This impressive program with an established record makes 'real', 'business' CPA available to a potentially huge market on a relatively cheap micro

John Tucker

List aid

Program *Silas* **Micro** BBC B **Price** £12 95 **Supplier** Astral Software, 152 Melton Road, Stanton-on-the-Wolds, Nottingham

Long program listings – either on screen or as a print-out – can be hard to decipher

The BBC micro has inbuilt aids to arranging program lists more legibly but they cannot cope well with multi-statement lines *Silas* – Super Intelligent List Augmenting System – can.

On screen it breaks up lines into sections, colours keywords and star (*) commands, indents *For-next* loops and inserts spaces where appropriate to help readability When used with an Epson-style printer it prints out these features with different type-styles to create the same effect and suppresses teletext codes which upset printers

Silas limits its indents on screen to sensible levels but on paper you can expect it to stretch right over 80 columns

Silas is a machine-code program that loads "transparently" from tape or disc into rarely-used sections of *Ram*

Press a function key and *List* your program to see it in Silas-scope Then *List* for an ordinary peep

Silas keeps out of the way until you want it.

A sensible and mercifully brief handbook explains the minor limitations of the utility

This is one of those practical aids that really does make life easier and is warmly recommended

Jan Watterson



Deft descent

Program *Devil's Descent* **Micro** Spectrum 48K **Price** £0 95 **Supplier** Central Solutions 500 Chesham House, 150 Regent Street, London W1R 5FA

You have to hand it to Pocket Money Software, its name is one hundred per cent accurate

This amount, just a bit under a pound, was pocket money even when I was a lad (and in those days .) But what about the game? After all, a pound spent is a pound wasted if the product is unplayable

Well, *Devil's Descent* is far from that. Admittedly it's rath er basic, but you didn't really expect *Frankie* did you? If instead you expected an arcade game, a sort of *Lunar Lander*, in fact you won't be disappointed You have a fleet of eight craft to guide left and right as they descent through forty screens of caverns avoiding ledges, plant-life, lasers and suspended skeletons

There are three speeds of sideways drift and you have to be pretty nifty in changing direction A knowledge of the screen to come helps too as you want to be in position when you enter it

It's extremely simple to describe but tricky to play and it proved surprisingly addictive There's always the hope that next time - just next time, you'll do it

Even if you only play it a handful of times it will have cost less than a dozen goes on an arcade machine Astounding value

John Minson

Spelt out

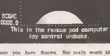
Program *Braxx Bluff* **Micro** CPC 464 **Price** £8.95 **Supplier** Amsoft, 169 Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF

Centuries from now, man has begun to explore unimaginably distant worlds in search of resorses and knowledge" it says on the inlay. Presumably when man finds the knowledge he will learn how to spell resources This game is converted from Micromega's Spectrum original and since their star programmer Derek Brewster has a thriving second career as a journalist we must assume that it is the Amsoft copyrighters who are responsible for such illiterate drivel as "creatures in there (sic) many forms have fued (sic) on the rovers (sic) energy banks" Perhaps the creatures in there many forms have feed on the writer's higher brain centres as well

Micromega's 3D range which included such gems as *Deathchase*

The scenario is reasonable enough – you are a sort of space ambulanceman who must find and rescue the people being 'feeded on by the creatures (in their many forms) You must land a spaceship, walk on wasteland, drive the rover over a marsh, a ruined city and an acid sea to get back to the base ship, all before the crewmen die It is a race against time made more difficult by the need for coordination and the aforementioned creatures Unfortunately playing it boils down to just steering things up and down, left and right and switching to the gun which fires up, down, left and right, etc.

Perhaps I'm being a bit harsh – Micromega never released anything really dreadful – but the whole thing somehow just lacks any spark, and the 3D looks dated and tired against the standards set by the likes of *Knightlore* and *Gyron* today



Once you have thrown away the box it is somewhat of a disappointment to find that perhaps the game should have gone with it *Braxx Bluff* was the last in the series of

Not really worth £9 unless you are desperate for a break from platform games

Tony Kendle

Word power

Program *Dictionary Use* **Micro** Commodore 64 **Price** £7 95 **Supplier** McGraw Hill, Shoppenhangers Road, Maidenhead, Berks SL6 2QL

Dictionary Use is an educational package in the "Ladders to Learning" series An unusual subject for a computer program, but I think it's handled rather well

Turning back the clock and trying to imagine myself as an eight-10 years old I fished out my dictionary and loaded the program Gee! Wow! It even has a loading screen.

The first couple of screens explain what dictionaries are and what they're used for. Then it w down to the real stuff – how to find a word

After sections on phonetic spelling how dictionaries are set out, using dictionaries to find out how a word is spelt, etc, etc, there is a final test to see if you've learnt anything in the last hour

Anything a youngster could want to know about dictionaries is here, along with useful advice "if this doesn't work, go and ask Mum and Dad"

The thing I liked about *Dictionary Use* is the way that it made the user actually participate in what's going on – you don't just sit watching the computer, learning nothing

This is achieved by the use of small tests after each section, which encourages the child to use his/her dictionary It is also pretty user friendly – no reprimands if you get a question wrong There's not much point in using the program twice, though Still, it's well-thought-out and presented

Tom Hussey

Micro Mania

Save the program in this game for Spectrum 48K by Simon Johnson

Thousands of bugs have been let loose within a program. It is up to you to save it from crashing by collecting all 12 of the registers used by the programmer before the bugs catch you.

Full instructions are given within the program. Good luck!

Program Notes

Line No	
4-43	Title screen
46-87	Initialisation of variables and presentation of screen
100-300	Mainframe loop
400-420	Clear playing section of screen
700-745	Death routine & game over routine
750-1080	Instructions
8000-9060	Define graphics and initialise machine code sound.

Note the underlined capital letters in the listing should be entered in graphic mode



```
4 GO SUB 9000: LET h$="SIMON JOHNSON": LET hc=5000
5 BORDER 0: PAPER 0: INK 5: CLS
6 PLOT 0,172: DRAW INK 2;255,0
7 REM intro screen
10 PRINT AT 0,7; BRIGHT 1;" DEADLY ERRORS "
20 LET sc=0: LET le=1: LET to=0
30 PRINT "CONTROLS..." 'Q ... UP      A ... DOWN" "N ... LEFT    M ... RIGHT"
32 PRINT  INK 6;'HIGH SCORE :" h$;"  ";hc
34 PRINT INK 4;  "PRESS 1 FOR INSTRUCTIONS" "PRESS 2 TO START GAME"
36 LET u=1: LET i=1: LET y1=20: LET y2=1: LET x1=1: LET x2=5: LET iu=-1: LET ui=1: PRINT AT y1,x1; INK 5;"A":AT y2,x2; INK 6;"B"
37 PRINT AT y1,x1; OVER 1;"A": LET y1=y1+iu: LET x1=x1+ui: IF y1>20 OR y1<2 THEN LET iu=iu*-1
38 IF x1>30 OR x1<1 THEN LET ui=ui*-1
39 PRINT AT y1,x1; OVER 1; INK 5;"A"
40 PRINT AT y2,x2; OVER 1;"B": LET y2=y2+u: LET x2=x2+i: IF y2>20 OR y2<2 THEN LET u=u*-1
41 IF x2>30 OR x2<1 THEN LET i=i*-1
42 PRINT AT y2,x2; INK 6; OVER 1;"B"
43 GO TO 37+12*(INKEY$="2")+1463*(INKEY$="1")
46 REM initialize variables
47 CLS
50 INK 4: LET a=10: LET b=15: LET c=10: LET d=0
90 INK 6: PLOT 0,39: DRAW 255,0: PLOT 0,136: DRAW 255,0: PLOT 0,20: DRAW 255,0
92 PLOT 0,155: DRAW 255,0: PLOT 70,40: DRAW -70,-30: PLOT 110,40: DRAW -40,-40: PLOT 150,40: DRAW 40,-40: PLOT 190,40: DRAW 65,-30
94 PLOT 70,135: DRAW -70,30: PLOT 110,135: DRAW -40,40: PLOT 150,135: DRAW 40,40: PLOT 190,135: DRAW 65,30
95 GO SUB 600: GO SUB 400: PRINT AT 0,11; INK 2;"SCORE ";sc
96 FOR t=1 TO (24-le): PRINT AT 5+RND*11,RND*31; INK 3; BRIGHT 1;"C": NEXT t
97 FOR t=1 TO 20: PRINT AT 5+RND*11,RND*31; INK 2; BRIGHT 1;"D": NEXT t
99 REM mainframe
100 PRINT AT a,b;" "
110 LET a=a+(INKEY$="a" AND a<16)-(INKEY$="q" AND a>5): LET b=b+(INKEY$="m" AND b<31)-(INKEY$="n" AND b>0)
112 IF ATTR (a,b)=66 THEN LET sc=sc+100+(le*10): LET to=to+1: GO SUB 350: POKE 23307,80: LET l=USR 23300
114 IF ATTR (a,b)=67 THEN GO TO 700
120 PRINT AT a,b; INK 5;"A"
140 PRINT AT c,d;" "
150 IF c<a THEN IF ATTR (c+1,d)<>66 THEN LET c=c+1
160 IF c>a THEN IF ATTR (c-1,d)<>66 THEN LET c=c-1
170 IF d>b THEN IF ATTR (c,d-1)<>66 THEN LET d=d-1
180 IF d<b THEN IF ATTR (c,d+1)<>66 THEN LET d=d+1
190 IF c=a AND d=b THEN GO TO 700
195 IF ATTR (c,d)=67 THEN LET c=5+INT (RND*10): LET d=0: POKE 23307,10: LET l=USR 23300
200 PRINT AT c,d; INK 6;"B"
300 GO TO 100
340 REM print score
350 PRINT AT 0,17; INK 4;sc
351 IF to=12 THEN FOR q=1 TO 18: PRINT AT 8,7; INK 4+RND*3;"LEVEL ";le;" COMPLETE": POKE 23507,90: LET l=USR 23300: POKE 23307,120: LET l=USR 23300: NEXT q: LET to=0: LET le=le+1: GO TO 50
360 RETURN
370 REM clear screen
400 LET k$="
410 FOR v=5 TO 16: PRINT AT v,0; PAPER RND*7+1;k$: NEXT v
420 FOR v=5 TO 16: PRINT AT v,0; PAPER 0;k$: PAUSE 1: NEXT v: RETURN
599 REM Prepare for next level
600 PRINT AT 10,5; INK 4; BRIGHT 1;"PREPARE FOR LEVEL ";le: BEEP .1,20: FOR v=1 TO 50: NEXT v: BEEP .1,20: FOR v=1 TO 50: NEXT v: BEEP .1,20: FOR v=1 TO 50: NEXT v: RETURN
700 REM Death Routine
710 FOR x=1 TO 30
720 PRINT AT a,b;"A": PRINT AT a,b; OVER 1; INK RND*4+3;CHR$ (70+RND*20)
730 POKE 23307,x: LET l=USR 23300: POKE 23307,x+5: LET l=USR 23300: NEXT x
740 IF sc>hc THEN LET hc=sc: GO TO 750
745 GO TO 5
750 CLS : PRINT  INK 7;"CONGRATULATIONS"  INK 6;"YOU HAVE ACHIEVED"  INK 5;"THE HIGHEST SCORE"''  INK 4;"PLEASE ENTER YOUR NAME"  INK 3;"BETWEEN 1 TO 20 LETTERS"
760 INPUT h$: IF LEN h$>20 THEN LET h$=h$( TO 20)
770 GO TO 5
1400 REM instructions
1500 CLS : INK 5: PRINT AT 0,7;"INSTRUCTIONS": PRINT "DEEP INSIDE THE CIRCUITS OF A   COMPUTER A DATA PULSE GLEEFULLY GLIDES ACROSS THE CONTROL LINES ON ITS WAY TO AN ADDRESS          DESTINATION."
1510 PRINT 'BUT WAIT',OH NO - A BUG - . DUE TO A PROGRAMMING ERROR THOUSANDSOF BUGS HAVE BEEN LET LOOSE AND ARE NOW ON THE RAMPAGE."
1520 PRINT "YOUR ONLY HOPE OF SURVIVOL IS TOCOLLECT ALL THE REGISTERS THAT  THE PROGRAMMER HAS USED (12 IN  ALL) BEFORE THE BUGS DESTROY YOU'
1530 PRINT "THE BUGS ARE FAST BUT WILL ACT  LIKE HOMING MISSILES AND FOLLOW YOUR EVERY MOVE SO YOU MUST TRY AND GUIDE THEM INTO A DEADLY     INTERUPT FLAG BEFORE THEY REACH YOU.'
1540 PRINT AT 21,7;"PRESS ANY KEY"
1550 IF INKEY$="" THEN GO TO 1550
1560 CLS : PRINT AT 0,6;"INSTRUCTIONS"
1570 PRINT  "IF YOU GUIDE A BUG INTO AN        INTERUPT FLAG IT WILL BE         DESTROYED."
1580 PRINT 'YOU WILL ALSO DIE IF YOU TOUCH AFLAG'
1590 PRINT "EACH LEVEL WILL GET SLIGHTLY     HARDER THAN THE LAST."
1600 PRINT  "CHARACTERS..."   INK 5;"A ... DATA PULSE"
1610 PRINT  INK 6;"B"; INK 5;" ... BUG"
1620 PRINT  INK 2;"D"; INK 5;" ... REGISTER"
1630 PRINT  INK 3;"C"; INK 5;" ... INTERUPT FLAG'
1640 PRINT AT 21,6;"PRESS ANY KEY
1650 IF INKEY$="" THEN GO TO 1650
1660 GO TO 5
8000 REM graphics and m/c sound
9000 FOR a=USR "A" TO USR "D"+7: READ s: POKE a,s: NEXT a
9010 DATA 60,90,165,219,219,165,90,60
9020 DATA 126,153,153,90,60,60,66,165
9030 DATA 1,2,3,4,5,6,7,8
9040 DATA 0,0,58,84,171,84,50,199
9050 FOR s=0 TO 19: READ z: POKE 23300+s,z: NEXT s: RETURN
9060 DATA 33,10,0,17,2,0,6,90,35,229,197,205,181,3,193,225,35,16,246,201
```

Manic mutants

The final helping of Pandemonia code written for the BBC by Jeffrey Cooke

A nuclear power plant has just exploded and in the ensuing "pandemonia" you attempt, in your already mutated form, to reach the reactor by ascending its waste pipe. You must attempt to stop dangerous particles reaching the sea as you progress through increasingly radioactive levels.

Mutated piranha fish attempt to eat you and various pieces of machinery as well as anti-matter block your path. As an air breathing creature, you must complete each level before your oxygen is exhausted, safe nuclear particles add to your score. Only you can save the sea from contamination.

To avoid 'spots before the eyes' syndrome, Jeffrey Cooke is making available copies of the game on tape. Write to him, enclosing £2.50, at 152 Gallagh Park, Derry, N Ireland BT48 8DF.

```
2660DATA 8CA57C80?E0C60A57CF0
2670DATA 1320C022A57CF00C2002
2680DATA 2220BC2220E8224C9022
2690DATA 20302360857A8570A57B
2700DATA 8571A9078575A9048574
2710DATA A9428577A92F8576205B
2720DATA 2560A57A8570A57B8571
2730DATA A9078575A90485762041
2740DATA 27A900857C60A57A8570
2750DATA A57B8571A9048572A907
2760DATA 8573202827A94420C526
2770DATA F00320A8226020002920
2780DATA 062320A82260A57A8570
2790DATA A57B8571A9048572A907
2800DATA 8573202827A90420C526
2810DATA F00320AE2260A9128570
2820DATA A9008571A9038572A900
2830DATA 8573A9C88574A9008575
2840DATA A9018576A9008577A270
2850DATA A000A90720F1FF60A9FF
2860DATA 20A128C960D00320AE20
2870DATA 60A900858BA903858AA9
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2890DATA 957AE8C8E006D0F52075
2900DATA 23A9008589A48AA68985
2910DATA 7A99360CE8C9E006D0F5
2920DATA 848AC68BD0D160A57CF0
2930DATA 1DA901857CA57F495585
2940DATA 7F20CA23A57CF00C2002
2950DATA 2220172520E9234C9023
2960DATA A57FF00FC67F6020EA28
2970DATA 20332520072360A57A85
2980DATA 70A57B8571A9038572A9
2990DATA 048576204127A57D857A
3000DATA A57E857BA900857CA9FF
3010DATA 857FA9A57A8570A57B85
3020DATA 71A9048572A908857320
3030DATA 2827A94420C526F00320
3040DATA A72360A57A8570A57B85
3050DATA 71A9048572A908857320
3060DATA 2827A90420C526F00320
3070DATA 9D2360A900858BA90485
3080DATA 8AA9008589A48BA6A9B9
3090DATA 900C957AE8C9E006D0F5
3100DATA 203F24A9008589A48BA6
3110DATA B9857A99900CE8C9E006
3120DATA D0F5848AC68BD0D160A5
3130DATA 7CF01DA901857CA57F49
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3150DATA 2002222001242085744C
3160DATA 6624A57FF00FC67F6020
3170DATA F52020ED242071246 0A5
3180DATA 7A8570A57B8571A90585
3190DATA 75A9038576204E27A57D
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3210DATA A9FF857F60A57A8570A5
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3300DATA 5D2560A9138570A90085
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3320DATA 328574A9008575A90185
3330DATA 76A9008577A270A000A9
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3480DATA A57369028573C675F005
3490DATA E6744C7325A570186900
3500DATA 8570A57169008571CA76
3510DATA D0A960A570290FC900F0
3520DATA 14C908F010A57038E901
3530DATA 8570A571E90085714CE8
3540DATA 25A57038E9798570A571
3550DATA E902857160A570290FC9
3560DATA 07F014C90FF010A57018
3570DATA 69018570A57169008571
3580DATA 4C1226A5701869798570
3590DATA A5716902857160A572C9
3600DATA 00F007A90085724C312A
3610DATA A57038E9018570A571E9
3620DATA 008571A9018572A90085
3630DATA 7360A572C901F007A901
3640DATA 85724C5420A570186900
3650DATA 8570A57169008571A900
3660DATA 8572A901857360A57038
3670DATA E9008570A571E9008571
3680DATA 60A5701869008570A571
3690DATA 6900857160A570490FA2
3700DATA 0120F4FFA0FFA670A981
3710DATA 20F4FF9860208F252059
3720DATA 266020BF25A672206720
3730DATA CAE0D0F8A60E6722059
3740DATA 26A67220E925CAE00000
3750DATA F860E673A672206726CA
3760DATA E000D0F8A67320E925CA
3770DATA E0D0D0F8608572A00081
3780DATA 7029558573817021AA6A
3790DATA 8574A572C573F009C574
3800DATA F005A9004CE72AA9FF60
3810DATA 208E25A572186A18AA20
3820DATA 6726CAE0D0F8602059
3830DATA 26205926A572186A18AA
3840DATA 20E925CAE0D0D0F860A5
3850DATA 72186A18AA206726CAE0
3860DATA D0D0F8A67320E925CAE0
3870DATA D0D0F860A573186A18AA
3880DATA 20E925CAE0D0D0F8A672
3890DATA 206726CAE0D0D0F860E6
3900DATA 75A5758579A9008574A5
3910DATA 798575A5708572A57185
3920DATA 73A900A0009172A57229
3930DATA 0FC90FF014C907F010A5
3940DATA 721869018572A5736900
3950DATA 85734C8627A572186979
3960DATA 8572A57369028573C675
3970DATA F005E6744C5727A57018
3980DATA 69088570A57169008571
3990DATA CA76D09660A98020A927
4000DATA A90FA20120F4FF20E0FF
4010DATA 20E429A9FF20892760A9
4020DATA A0FF88C000D0FBCAE000
4030DATA D0F460203619A200BD00
4040DATA 0A20EEFFE8E0C8D0F520
4050DATA 452920882920212B6020
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4180DATA A20020FA2720542A2019
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4200DATA 3829A9008585C6A46040
4210DATA 081BADFF0C100FA2028D
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4240DATA 0C2EFF0C38D00CADFF0C
4250DATA 608570207729E5709003
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4270DATA 0AAABDAE2F857AE8BDAE
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4430DATA A58F290F0A0A0A0A1869
4440DATA 3020EEFFA58F290F1869
4450DATA 3020EEFFA58E29F04A4A
4460DATA 4A4A18693020EEFFA58E
4470DATA 290F18693020EEFF60A5
4480DATA 8B20332960A91F20EEFF
4490DATA A90F20EEFFA91E20EEFF
4500DATA A58D29F04A4A4A4A1869
4510DATA 3020EEFFA58D290F1869
4520DATA 3020EEFF60A58C186901
4530DATA 858CC940D023A900858E
4540DATA A58DF016F838E901858D
4550DATA D8A58DC904B003205C2A
4560DATA 2088294CE329A2018585
4570DATA 20882960A900857BA903
4580DATA 8570A9F18572A9FF8573
4590DATA A900857185758577A579
4600DATA 1020A9408F008574E889
4610DATA F0088576A270A000A907
4620DATA 20F1FFA57B16A9018570
4630DATA C907D0DC60A91720EEFF
4640DATA A90020EEFFA90A20EEFF
4650DATA A92020EEFFA90020EEFF
4660DATA A90020EEFFA90020EEFF
4670DATA A90020EEFFA90020EEFF
4680DATA A90020EEFF60A9048DC0
4690DATA 0800F860A9028570A900
4700DATA 8571A9F18572A9FF8573
4710DATA A9FF8574A9008575A901
4720DATA 8576A9008577A270A000
4730DATA A90720F1FF60A580186A
4740DATA B003202A1E602C052080
4750DATA 922022292689A52A9192
4760DATA D0A5209102C898482031
4770DATA 9220978AC92EF0D5C929
```

```
4780DATA F0034C27916B05156B05
4790DATA 3FA0008540203692A000
4800DATA A5159102A52A092A9002
4810DATA E62EA50385E8A5028537
4820DATA 18652A48A52B65038534
4830DATA 0AC404E505002D640266
4840DATA 03A53765154A8A908537
4850DATA 9002E63B9137C8000000
4860
4870
5000DATA 00000000000000000000
5010DATA 0000000000000000040C
5020DATA 0C0C04000404040404000
5030DATA 000000000000C0C0C0C0C
5040DATA 0C0C0C0C0C0C0C0C040404
5050DATA 00000C3F200C0C0C0C0C
5060DATA 0C0C0C0C0C080C000000
5070DATA 00000C0C00000B080008
5080DATA 00000000000000000000
5090DATA 00000000000000000000
5100DATA 00000000000000000000
5110DATA 00000000000000000000
5120DATA 00040400000000000000
5130DATA 00000000000000C0C0C0C
5140DATA 0C0C040C0C0C0C0C0400
5150DATA 040400000C1D1D0C0C0C
5160DATA 0C0C0C0C0C0C0C0C0C0800
5170DATA 00002A020C0C0000C0C
5180DATA 0C0C00000080C0000000
5190DATA 00000000000000000000
5200DATA 00000000000000000000
5210DATA 00000000000000000000
5220DATA 00000000000000000000
5230DATA 00000000000000000000
5240DATA 00000C0C000004040404
5250DATA 000004000000C3F170C
5260DATA 0C040C0C0C0C0C0C0C0404
5270DATA 0C00000C0C0C0C0C0C0C
5280DATA 0C0C0C0C0C0C080B080000
5290DATA 080C0C0C08000B080800
5300DATA 08000000000000000000
5310DATA 00000000000000000000
5320DATA 00000000000000000000
5330DATA 00000000000000000000
5340DATA 00000000040400000000
5350DATA 00000000040000000415
5360DATA 010C0C00040C0C0C0C00
5370DATA 00040C00000C2E2E0C0C
5380DATA 0C0C0C0C0C0C0C0C0C0C04
5390DATA 00000C0C0C0C0C0C000C0C
5400DATA 0C0C3C08000080000000
5410DATA 08080800000000000080
5420DATA 00000000000000000000
5430DATA 00000000000000000000
5440DATA 00000000000000000000
5450DATA 0000000014303C143C14
5460DATA 000000003B3C3C3C3C3C
5470DATA 000000703D3C3C3C5030
5480DATA 10000020303C3C3C3C28
5490DATA 0000000203C3C3C2800
5500DATA 000000000003C3C3C0000
5510DATA 000000143830303030814
5520DATA 00000000000000000000
5530DATA 00000000000000000000
5540DATA 000000283430303034280
5550DATA 00000000003C3C3C0000
5560DATA 000000103C3C3C1400
5570DATA 00000010303C3C3C3C10
5580DATA 000000503B3C3C3C3050
5590DATA 2000000343C3C3C3C3C
5600DATA 00000000283E3C283C28
5610DATA 00000000000000000000
5620DATA 00000000000000000000
5630DATA 0000000000141400140
5640DATA 0000000003C3E3C3C3C3C
5650DATA 000000103030C3C3C3030
5660DATA 00000030303C3C3C3430
5670DATA 20000000303C3C3C3D00
5680DATA 00000000003C3C3C0000
5690DATA 00000000143830381400
5700DATA 00000028282828282828
5710DATA 00000000000000000000
5720DATA 00000000000000000000
5730DATA 00000014101810101014
5740DATA 00000000283434342800
5750DATA 0000000003C3C3C0000
5760DATA 00000000303E3C3C3C00
5770DATA 00000030303C3C3C3B50
5780DATA 10000020303C3C3C3454
5790DATA 0000000003C3D3C3C3C3C
5800DATA 00000000028280028001
5810DATA 00000000000000000000
5820DATA 00000000000000000000
5830DATA 00000102030100000003
5840DATA 03010503030000000203
5850DATA 03020000000000000000
5860DATA 11221100002233220000
5870DATA 00000000000000000040
5880DATA 00005500004000000000
5890DATA 40FF4000000000AAAAEA
5900DATA FFEAAAA0000000000FF
5910DATA 00B04000000000000000
5920DATA 00000000058040000001
5930DATA 03070301000000028702
5940DATA 0000003A803C003F0041
5950DATA 004480044004780490004E
5960DATA 00500053805500590005A
5970DATA 005B005F00620064000067
5980DATA 8049006E006E00710000
5990DATA 60000000000100000000
6000DATA 00000000000000000060
6010DATA 00000000000000000000
6020DATA 0000000F000000000000
6030
6040DATA 16021200001300050000
6050DATA 0019040000009E001905FF
6060DATA 849E001904000000319
6070DATA 05FF04980031904080096
6080DATA 001905FF04960019040
6090DATA 0088031905FF0488031
6100DATA 04C0089600190SC8008
6110DATA 0019055E01800019055E
6120DATA 019600190C8000803119
6130DATA 05C800960319055E0196
6140DATA 0319055E01960319049D
6150DATA 03960019059D0580019
6160DATA 0533048800190533049
6170DATA 0019049D03980319059D
6180DATA 03960319053304960319
6190DATA 053304800031F04001102
6200DATA 2050414E4445424F4E49
6210DATA 41201200A1300000000
6220DATA 001904000009E00190500
6230DATA 0080031904FF049E0019
6240DATA 09FF04000300000000000
6250DATA 00000000000000000000
6260DATA 00000000000000000C000
6270DATA 00000000000000000000
6280DATA 00000000000000100000
6290DATA 00000000000000410000
6300DATA 00004060008T000085D
6310DATA 00000000305401000000
6320DATA F06301000000000420100
6330DATA 000000680000000000084
6340DATA 00000008855000000000
6350DATA 003C00083C5C004100009
6360DATA 41E6004600B846170848
6370DATA 00064B0AB85000085085
6380DATA 0B5500B855450B5400B
6390DATA 5ACF005F00085FFB0864
6400DATA 00086A18869000B692E
6410DATA 886E000B6E7300000000
6420DATA 00000000000000000000
6430DATA 00000000000000000100
6440DATA 0B3C000B3C5C0B41004B
6450DATA 41E6884600084617B64B
6460DATA 00884B5A885000885085
6470DATA 085500085545B85A00B8
6480DATA 5ACF085F00085FFB0864
6490DATA 000864A18B6900B6692E
6500DATA 0B6E0008E6E7300000000
6510DATA 00000000000000000000
6520DATA 00000000000000000000
6530DATA 1010101010106503750
6540DATA 65037703690380105950B
6550DATA 101000410001000540AC
6560DATA 0001000085000000000
6570DATA 305401000000F0630100
6580DATA 000000420100000000006E
6590DATA 00000000A04600000000
6600DATA 00550000000000B3C00B
6610DATA 3C5C8B4100084!E6B846
6620DATA 00084617884B00084B8A
6630DATA 08500008508508550090
6640DATA 55450854008B5ACF085F
6650DATA 0085FFD0B8640086441
6660DATA 08690006692E086E0008
6670DATA 6E730000000000000000
6680DATA 00000000000000000000
6690DATA 000000000000083C000B
6700DATA 3C5C0B410084!E6B846
6710DATA 008046178B4B000B4096
6720DATA 985000085085085500B
6730DATA 5545085A00085ACF085F
6740DATA 0085FFD0B8640086441
6750DATA 0B69000B692E0B6E000B
6760DATA 6E730000000000000000
6770DATA 00000000000000000000
6780DATA 00600000000000000000
6790DATA 00000000000000000000
6800DATA 00000000000000000000
6810DATA 00000000000000000000
6820DATA 00000000000000000000
6830DATA 00000000000000000000
6840DATA 00000000000000000000
```

The plot continues

*Part Two of a graph plotting routine for the QL written by **John Cochrane***

Space does not permit me to present a full line-by-line description of the program and its workings. The following should give you a general idea of what's going on though and will give you sufficient clues to work through the details by yourself.

Program notes

Lines 150 to 280 control the running of the program. I have not attempted to be too clever in terms of program layout, I needed the thing to be simple to follow rather than fast or compact. Also, I have not made the program fully foolproof, put in silly data and it's your own fault if you get rubbish out. The program waits for you to press a key (Line 260) to end.

Procedures *Start Up* and *Read-Data* set up the input data and initialise certain variables which specify the display special mention. 'line-type()' determines the type of curve fit, zero for no curve, one to four for a polynomial of order one to four, and five for a line joining each data point (data is sorted by increasing x-value). Don't use over-long titles, the main title can be up to 29 characters long, the axis titles up to around 20 characters each and the key-descriptions up to around 12 characters.

Procedure *Find-Fit* contains the least-squares curve-fitting algorithms. Don't ask me to explain this lot, if you really want to get into this sort of thing then I suggest you read a book by Terry E. Shoup called *Numerical Methods for the Personal Computer* (Prentice-Hall). There are other ways to fit curves to data, spline-functions for example, which you may like to add here.

Automatic scaling is provided by procedures *Find-Scale* and *Get-Scale*. Different people like to scale their graphs in different ways. The most important factors are set in Lines 1990 to 2090. These set the permissible intervals between graph grids. The various "complications" in lines 2030-2080 are there to try and set sensible values for the axis end-points, if possible, *Get-Scale* sets zero at the plot origin.

A blank graph is plotted by procedures *Draw Graph* and *Draw-Axes*, which make use of the plotting routines *Move-To-xy* and *Plot-To-xy*. The plotting routines are set up as separate routines because I wanted to be able to easily convert the program to output to a plotter or plotting-printer. This wastes a little space but increases versatility. If you want to dispense with this feature then you should be able to replace most of the *Plot-To-xy* calls with *Line-R* and also dump the variables *'old-x'* and *'old-y'* at the same time.

The data itself is plotted by procedures *Plot-Data, Mark, Plot-Cross,* and *Plot-Poly*. In extreme cases you may find that the curve goes off the graph area. The only easy thing to do in this eventuality is to try to fit a lower order curve to the data.

Finally, a key is displayed at the bottom of the screen (by *Print-Key*) to show what is what. The procedure *Get-Mem* is used to define four-character strings for the numbers to be used when annotating the axes.

I hope that most of the variable-names are self-explanatory and that you will be able to follow most of the program's workings. Drop me a line through *Popular* if you want more information.

```
1730      END FOR K
1740      IF temp_1=0 THEN N=data_points(n_line)
1750    END FOR N
1760    IF x_min>x(n_line,1) THEN x_min=x(n_line,1)
1770    IF x_max<x(n_line,data_points(n_line)) THEN
1780      x_max=x(n_line,data_points(n_line))
1790    END IF
1800    FOR K=1 TO data_points(n_line)
1810      IF y_min>y(n_line,K) THEN y_min=y(n_line,K)
1820      IF y_max<y(n_line,K) THEN y_max=y(n_line,K)
1830    END FOR K
1840  END FOR n_line
1850  REMark Scale axes... .
1860  gen_min=x_min:gen_max=x_max
1870  GET_SCALE
1880  xs_min=scale_min:xs_max=scale_max
1890  x_ivl=scale_interval:x_power=scale_power
1900  gen_min=y_min:gen_max=y_max
1910  GET_SCALE
1920  ys_min=scale_min:ys_max=scale_max
1930  y_ivl=scale_interval:y_power=scale_power
1940 END DEFine FIND_SCALE
1950 :
1960 DEFine PROCedure GET_SCALE
1970  absolute_max=ABS(gen_max)
1980  IF absolute_max<ABS(gen_min) THEN absolute_max=ABS(gen_min)
1990  absolute_ivl=(gen_max-gen_min)/30
2000  IF absolute_ivl<(absolute_max/20) THEN absolute_ivl=absolute_max/20
2010  scale_power=INT(LOG10(absolute_ivl)+LOG10(2))
2020  IF absolute_ivl>.5*10^scale_power THEN scale_power=scale_power-1
2030  temp_1=absolute_ivl/(10^scale_power)
2040  temp_2=1
2050  IF temp_1>1 THEN temp_2=2
2060  IF temp_1>2 THEN temp_2=2.5
2070  IF temp_1>2.5 THEN temp_2=5
2080  scale_interval=temp_2*10^scale_power
2090  scale_min=scale_interval*INT(gen_min/scale_interval)
2100  temp_1=10-INT((gen_max-scale_min)/scale_interval)
2110  temp_2=scale_min-scale_interval*temp_1
2120  IF scale_min>=0 AND temp_2<=0 THEN scale_min=0
2130  IF scale_min<0 THEN scale_min=scale_min-scale_interval*INT(temp_1/2
)
2140  scale_max=scale_min+10*scale_interval
2150 END DEFine GET_SCALE
2160 :
2170 DEFine PROCedure DRAW_GRAPH
2180  REMark Set up blank graph etc.. ..
2190  CLS #1
2200  INK #1,7:PAPER #1,2:CSIZE #1,3,0
2210  CLS #1,3
2220  temp_1=INT((4.5-LEN(title$)/2)
2230  IF temp_1<0 THEN temp_1=0
2240  AT 0,temp_1:PRINT title$
2250  PAPER #1,0:CSIZE #1,0,0
2260  temp_1=INT((12-LEN(y_title$)/2)
2270  IF temp_1<0 THEN temp_1=0
2280  AT temp_1,0
2290  FOR K=1 TO LEN(y_title$)
2300    PRINT y_title$(K)
2310  END FOR K
2320  temp_1=INT(39-LEN(x_title$)/2)
2330  IF temp_1<0 THEN temp_1=0
2340  AT 22,temp_1:PRINT x_title$;
2350  CSIZE #1,0,0
2360  IF y_power<0 OR y_power>1
2370    AT 1,1:PRINT "10^";y_power;"]"
2380  END IF
```

```
2390  GET NUM ys max,y power
2400  AT 2,1:PRINT number$
2410  GET NUM (ys max+ys_min)/2,y power
2420  AT 11,1:PRINT number$
2430  GET_NUM ys_min,y_power
2440  AT 21,1:PRINT number$
2450  GET_NUM xs_min,x_power
2460  AT 21,3:PRINT number$
2470  GET NUM (xs min+xs max)/2,x_power
2480  AT 21,37:PRINT number$
2490  GET NUM xs max,x power
2500  AT 21,71:PRINT number$
2510  IF x_power<0 OR x_power>1
2520    AT 22,68:PRINT "(x",10^x power;")"
2530  END IF
2540  DRAW AXES
2550 END DEFine DRAW GRAPH
2560 :
2570 DEFine PROCedure DRAW_AXES
2580  REMark Plot axes .
2590  x scale=x axis length/(xs max-xs min)
2600  y scale=y axis length/(ys max ys min)
2610  new x=-2*tick_x:new_y=0:MOVE_TO_XY
2620  new x=old x+2*tick_x:PLOT_TO_XY
2630  FOR L=1 TO 10
2640    new_x=old_x+x axis_length/10:PLOT_TO_XY
2650    new_y=old y-tick_y
2660    IF L=5 OR L=10 THEN new_y=new_y-tick y
2670    PLOT TO XY
2680    new y=old_y+tick_y
2690    IF L=5 OR L=10 THEN new_y=new_y+tick y
2700    MOVE TO XY
2710  END FOR L
2720  new x=0:new y=-2*tick_y:MOVE_TO_XY
2730  new_y=old y+2*tick_y:PLOT_TO XY
2740  FOR L=1 TO 10
2750    new_y=old y+y axis_length/10:PLOT TO XY
2760    new x=old x-tick x
2770    IF L=5 OR L=10 THEN new x=new x-tick_x
2780    PLOT TO XY
2790    new_x=old_x+tick x
2800    IF L=5 OR L=10 THEN new_x=new_x+tick_x
2810    MOVE TO XY
2820  END FOR L
2830  REMark Plot zero axes if req'd ...
2840  IF xs min<0 AND xs max>0 THEN
2850    new x=x scale*ABS(xs min):new y=0:MOVE TO_XY
2860    new y=old y+y axis length:PLOT_TO_XY
2870  END IF
2880  IF ys_min<0 AND ys max>0 THEN
2890    new x=0:new_y=y_scale*ABS(ys_min):MOVE_TO_XY
2900    new x=old_x+x_axis_length:PLOT_TO_XY
2910  END IF
2920 END DEFine DRAW_AXES
2930 :
2940 DEFine PROCedure MOVE TO_XY
2950   old x=new x:old y=new y
2960 END DEFine MOVE TO_XY
2970 :
2980 DEFine PROCedure PLOT_TO XY
2990   LINE #1,old_x,old_y TO new_x,new_y
3000   old x=new_x:old_y=new_y
3010 END DEFine PLOT_TO_XY
3020 :
3030 DEFine PROCedure PLOT DATA
3040   REMark Plot the points.
3050   new x=x scale*(x(n_line,1)-xs_min)
3060   new y=y scale*(y(n_line,1)-ys_min)
3070   MOVE TO XY
3080   FOR L=1 TO data points(n line)
3090     new x=x scale*(x(n line,L)-xs_min)
3100     new_y=y_scale*(y(n line,L)-ys min)
3110     IF line type(n line)<4 THEN
         PLOT TO XY :ELSE MOVE TO_XY
3120     MARK
3130   END FOR L
3140   type_of_line=line_type(n line)
3150   SELect ON type_of_line
3160    =1 TO 4
3170     PLOT_POLY
3180   END SELect
3190 END DEFine PLOT DATA
3200 :
3210 DEFine PROCedure MARK
3220   SELect ON n line
3230    =1
3240     PLOT CROSS
3250    =2
3260     PLOT SQUARE
3270    =3
3280     CIRCLE old x,old_y,tick_x
3290   END SELect
3300 END DEFine MARK
3310 :
3320 DEFine PROCedure PLOT CROSS
3330   new x=old x-tick_x:new y=old y-tick_y:MOVE_TO XY
3340   new_x=old x+2*tick_x:new y=old_y+2*tick_y:PLOT_TO XY
3350   new_y=old y-2*tick_y:MOVE TO_XY
3360   new_x=old_x-2*tick_x:new y=old_y+2*tick y:PLOT TO XY
3370   new x=old x+tick x:new_y=old_y-tick y:MOVE TO XY
3380 END DEFine PLOT CROSS
3390 :
3400 DEFine PROCedure PLOT SQUARE
3410   new x=old x-tick x:new_y=old y-tick_y:MOVE_TO XY
3420   new x=old x+2*tick x:PLOT_TO_XY
3430   new y=old_y+2*tick_y:PLOT_TO_XY
3440   new_x=old x-2*tick x:PLOT_TO_XY
3450   new_y=old_y 2*tick_y:PLOT_TO_XY
3460   new_x=old_x+tick x:new_y=old_y+tick y:MOVE TO XY
3470 END DEFine PLOT_SQUARE
3480 :
3490 DEFine PROCedure PLOT_POLY
3500   x_coord=x(n line,1):new x=x scale*(x_coord-xs_min)
3510   y_coord=B(1)+B(2)*x coord+B(3)*x coord^2+B(4)*x coord^3+B(5)*x_coord
^4
3520   new y=y scale*(y coord-ys_min)
3530   MOVE TO XY
3540   FOR L=x(n line,1) TO x(n_line,data_points(n_line))+x_iv)/4 STEP x iv
/4
3550     x coord=L:new x=x_scale*(x coord-xs_min)
3560     y coord=B(1)+B(2)*x_coord+B(3)*x coord^2+B(4)*x coord^3+B(5)*x_coo
rd^4
3570     new_y=y scale*(y coord-ys min)
3580     PLOT_TO XY
3590   END FOR L
3600 END DEFine PLOT POLY
3610 :
3620 DEFine PROCedure PRINT KEY
3630   IF number_of lines<2 THEN RETurn
3640   IF line type(n line)>3 THEN line_type(n_line)=4
3650   data points(n line)=2
3660   x(n_line 1)=xs_min+(n_line-1)*3.5*(xs_max-xs_min)/10
3670   y(n_line,1)=ys_min (ys max ys min)/8
3680   x(n_line,2)=x(n_line,1)+(xs max-xs min)/10
3690   y(n line,2)=y(n_line,1)
3700   PLOT DATA
3710   AT 23 (n*(n line-1)+23:PRINT key$(n line)
3720 END DEFine PRINT KEY
3730 :
3740 DEFine PROCedure GET_NUM (number,power)
3750   SELect ON power
3760    =0 TO 1
3770     number$=""    "&INT(number* 5):number$=number$(LEN(number$)-4 TO)
3780    =REMAINDER
3790     temp 1=SE 2*INT(100*number/(10 power)+.5)
3800     number$=""     "&temp 1:number$=number$(LEN(number$)-4 TO)
3810   END SELect
3820 END DEFine GET NUM
```



Colour swapping

*Animate your figures by colour swapping on the 464 – from **J W Constable***

Colour swapping is a technique possible on machines such as the Amstrad and BBC that allows the colour of 'pens' that have been used to print or draw to be changed. On the Amstrad the technique works like this.

Pens one to 15 are used to draw – for instance – 15 adjacent parallel lines. Then all Pens are filled with *Ink* the same colour as the *Paper* which in this case will be set to zero (let us say that this background is black). This means that all the coloured lines effectively disappear as far as the eye is concerned. However, they are actually still there but coloured black.

Now if the *Ink* in each Pen in turn is changed to, let us say, blue and then back to black again, a single line appears to move across the screen. If this process is now extended to pictures or various stages of a rotating shape then the result is very fast animation.

The Lissajous Figures program is one which uses this colour swapping technique. The plotting can be speeded up by increasing the *Step* rate in Line 140, but the larger it gets the more the lines start to break up. The animation can be speeded up or slowed down by altering the 'wait' loops in Lines 230 and 270.

For this particular plot, as half of the pattern repeats itself going in the opposite direction it is possible to draw twice the amount of positions of the figure in half a cycle, and then step backwards through the colours in the animation section as well as forwards to complete the second half of the rotation. To see what I mean delete Lines 250 to 280 to see just half the cycle.

Line 150 may be altered and experimented with to produce different Lissajous figures or plots of other functions, but the associated lines and *For/Next* loops must be changed to customise the program to produce the best effect for the new function, as they were with this example.

When using the technique two main things must be remembered. Firstly, whatever is plotted must only have 15 stages (although the Lissajous Figures program effectively has 30 because half of it is repeated). This is because 15 is the maximum number of Pens allowed in *Mode 0* excluding one Pen for the *Paper* or background.

Secondly, if one part of a plotted shape is superimposed on another part of a previous shape in the previous Pen then that part of the previous shape will be overwritten and lost, so try to avoid this. You can see what I mean from the early stages of the Figures program. The problem is more pronounced in *Mode 0* where the pixels are bigger and more likely to overlap, so if the thing that you are animating can be done with a total of four Pens (including one background or *Paper* Pen) then use *Mode 1*.

The *On Break Gosub* statements in Line 60 and 300 are to prevent the program from being stopped and leaving the user with an unusable set of *Inks* – a common problem when breaking out of a program that uses colour swapping. The *Call &BBFF* resets the Pen *Inks* to default values. I found the *Mode 1* command necessary because the machine code call appears to corrupt *Mode 0* by mixing it with *Mode 1*. Delete the *Mode 1* in Line 300 to see what I mean.

I leave you with the second program which I think is more impressive.

```
10 '=====================
20 '=lissajous figures=
30 '=  demonstration  =
40 '=====================
50 '
60 ON BREAK GOSUB 300
70 MODE 0
80 DEG
90 m=130
100 ORIGIN 320,200
110 b=0
120 FOR p=0 TO 100 STEP 180/14
130 b=b+1
140 FOR t=0 TO 360 STEP 1.5
150 PLOT SIN(t+p)*m,SIN(t)*m,b
160 NEXT t
170 NEXT p
180 FOR b=1 TO 15
190 INK b,1
200 NEXT b
210 FOR b=2 TO 15
220 INK b-1,1:INK b,23
230 FOR w=1 TO 20:NEXT w
240 NEXT b
250 FOR b=14 TO 1 STEP -1
260 INK b+1,1:INK b,23
270 FOR w=1 TO 20:NEXT w
280 NEXT b
290 GOTO 210
300 MODE 1: CALL &BBFF
```

```
10
20  ***********************
30  *                     *
40  *   3D ROTATING CUBE  *
50  *                     *
60  ***********************
70
80 MODE 0
90 ORIGIN 320,200
100 DIM x(50),y(00),z(50)
110 m=100
120 DEG
130 FOR i=1 TO 15:INK i,9:NEXT i
140 BORDER 0:PAPER 0:INK 0,0:CLS
150 FOR c=1 TO 17
160 READ x(c),y(c),z(c)
170 NEXT c
180 p=0
190 FOR t=1 TO 90 STEP 6
200 p=p+1:IF p=16 THEN p=1
210 MOVE ((x(1)*COS(t)-y(1)*SIN(t))
+z(1)/2)*m,((x(1)*SIN(t)+y(1)*COS(t
))+z(1)/2)*m
220 FOR c=1 TO 17
230 DRAW ((x(c)*COS(t)-y(c)*SIN(t))
+z(c)/2)*m,((x(c)*SIN(t)+y(c)*COS(t
))+z(c)/2)*m,p
240 NEXT c
250 NEXT t
260 FOR i=1 TO 15:INK i,0:NEXT i
270 FOR i=1 TO 15
280 INK i-1,0:INK i,9
290 FOR q=1 TO 50 :NEXT q
300 NEXT i
310 INK 15,0
320 GOTO 270
330 DATA 1,1,1,1,1,1,-1,1,1,-1,1,-1
,1,1,-1,1,1,1,1,-1,1,-1,-1,1,-1,-1,
-1,1,-1,-1,1,-1,1,1,-1,-1,1,1,-1,-1
,1,-1,-1,-1,-1,-1,-1,1,-1,1,1
```

Numbered in full

Spoken numbers on the 64 (with the Currah Speech Unit) courtesy of ***Chris Cattanach***

The Currah Speech Unit has developed a reputation as one of the more versatile speech units. Unlike units which have a limited "fixed" vocabulary, the Currah's speech chip allows one to build up any word one desires from a suitable combination of allophones.

One drawback of the speech, where numbers are concerned, is that all numbers greater than ten are read out as a single series of single digits. Thus 123 is spoken as one two three, instead of as one hundred and twenty three.

Developed on the Currah Commodore 64 speech unit, this program rectifies this situation, and allows numbers entered to be spoken correctly. The program caters for all numbers up to 999,999 999 (nine hundred and ninety-nine million, nine hundred and ninety-nine thousand, nine hundred and ninety-nine), which should be entered without the commas. Decimals are catered for up to two decimal places, but this could easily be extended if desired. It has only been limited to avoid the repetition of a large number of zero's.

Program Notes

The main program lies between Lines 8900 and 10020 and is accessed by a *Gosub* command incorporated in Lines 1-23 at the beginning of the program. The program can thus be easily incorporated into one's own program, which can lie between Lines 30 and 8898.

When the program is *Run*, the number to be spoken is entered at Line 22. Lines 9000-9003 decide if the number is an integer or a decimal.

Lines 9070-9299 determine the length of the number entered, in order to allocate the necessary words used in speaking it. Some numbers are spoken in a unique way (eg, numbers 10 to 19, hundred, . million, etc), and this is catered for in Lines 9304-9324 and 10000-10020. To get out of the counting program one enters the double symbol ££.

If this program is used in conjunction with one's own program, certain constants should be avoided to avoid confusion. These are as follows: *C1$-C9$, D1$-D9$, E$, E1$, E2$, G1$, R$, HN$ ML$, TH$, F1, F2, E%, E3$* and *Z1$*

```
1 REM"VOICED NUMBERS"
2 PRINT"VOICED NUMBERS BY C.J.CATTANACH"
3 POKE53281,7
5 INIT
20 GOSUB10000
22 GOSUB8902 GOSUB8902 GOSUB9430 F2=0 F1=0
   INPUTE$
23 GOSUB9000
8900 GOTO22
8902 IFF1=1THEN9354
8903 IFF1=2THEN9350
8904 IFF1=3THEN9375
8905 IFF1=4THEN9389
8906 IFF1=5THEN9421
8907 IFF1=6THEN9378
8999 RETURN
9000 IFVAL(E$)-INT(VAL(E$))=0THEN9005
9002 Z1$=STR$(INT(100*(VAL(E$)-INT(VAL(E$))
     ))/100) E$=STR$(INT(VAL(E$))) F2=9
9003 E9%=LEN(E$) E$=MID$(E$,2,E9%-1)
9005 E=VAL(E$) E%=LEN(E$)
9010 IFE$="££"THEN9013
9011 GOTO9070
9013 KOFF
9014 STOP
9070 IFE%=9THEN9420
9072 IFE%=8THEN9387
9074 IFE%=7THEN9369
9075 IFE%=5THEN9357
9076 IFE%=5THEN9352
9077 IFE%=4ANDRIGHT$(E$,3)="000"THEN9339
9078 IFE%=4ANDRIGHT$(E$,3)<>"000"THEN9341
9080 IFE%=3ANDRIGHT$(E$,2)="00"THEN9330
9081 IFE%=3ANDMID$(E$,2 1)="0"THEN9362
9082 IFE%=3ANDRIGHT$(E$ 2)<>"00"THEN9333
9084 IFE%=2ANDVAL(E$)<20THEN9304
9085 IFE%=2ANDRIGHT$(E$,1)="0"THEN9316
9086 IFE%=2AND(RIGHT$(E$,1))<>"0"THEN9325
9090 IFE%=1THEN9300
9239 STOP
9300 SAYE$
9301 GOTO9500
9304 IFE$="10"THENSAYD1$
9305 IFE$="11"THENSAYC1$
9306 IFE$="12"THENSAYC2$
9307 IFE$="13"THENSAYC3$
9308 IFE$="14"THENSAYC4$
9309 IFE$="15"THENSAYC5$
9310 IFE$="16"THENSAYC6$
9311 IFE$="17"THENSAYC7$
9312 IFE$="18"THENSAYC8$
9313 IFE$="19"THENSAYC9$
9314 GOTO9500
9316 IFE$="20"THENSAYD2$
9317 IFE$="30"THENSAYD3$
9318 IFE$="40"THENSAYD4$
9319 IFE$="50"THENSAYD5$
9320 IFE$="60"THENSAYD6$
9321 IFE$="70"THENSAYD7$
9322 IFE$="80"THENSAYD8$
9323 IFE$="90"THENSAYD9$
9324 GOTO9500
9325 R$=E$ R%=E% E$=LEFT$(E$,1)+"0" E%=LEN(E$)
9326 GOSUB9316 E$=R$ E%=R%
9327 E$=RIGHT$(E$ 1) SAYE$
9329 GOTO9500
9330 E1$=LEFT$(E$,1) SAYE1$
9331 SAYHN$
9332 GOTO9500
9333 R$=LEFT$(E$,1) GOSUB9382
9335 SAY"AND"
9336 E$=RIGHT$(E$ 2)
9337 GOTO9005
9338 R$=LEFT$(E$,1) SAYR$
9339 SAYTH$
9340 GOTO9500
9341 R$=LEFT$(E$,1) SAYR$
9342 SAYTH$
9343 IFRIGHT$(E$,3)="000"THEN9500
9344 IFMID$(E$,2,2)="00"ORMID$(E$,2,1)="0"
     THEN9346
9345 E$=RIGHT$(E$,3) GOTO9005
9346 SAY"AND"
9347 IFMID$(E$,2,2)="00"THEN9349
9348 E$=RIGHT$(E$ 2) GOTO9005
9349 IFRIGHT$(E$,1)="0"THEN9500
9350 R$=RIGHT$(E$,1) SAYR$
9351 GOTO9500
9352 G1$=RIGHT$(E$,3) F1=1 E$=LEFT$(E$,2)
     GOTO9005
9354 F1=0 SAYTH$
9355 E$=" "+G1$ GOTO9343
```

```
9357 G1$=RIGHT$(E$,3) E$=LEFT$(E$,3) F1=2
     GOTO9005
9358 SAYTH$
9359 F1=0 E$=G1$ GOTO9355
9362 E1$=LEFT$(E$ 1) SAYE1$
9363 SAYHU$
9364 SAYAND'
9365 E1$=RIGHT$(E$,1)
9366 SAYE1$
9367 GOTO9500
9369 E1$=LEFT$(E$,1) E2$=RIGHT$(E$,3) SAYE1$
9370 SAYML$
9371 IFVAL(MID$(E$,2,6))=0THENGOTO9500
9372 E$=MID$(E$,2 3)
9373 IFE$="000'THEN9381
9374 IFLEFT$(E$,2)="02"ANDRIGHT$(E$,1)<>'0'
     THEN9380
9375 F1=0 IFVAL(LEFT$(E$,1))=0THEN9377
9376 E$=E$+E2$ GOTO9005
9377 E$=MID$(E$ 2,2) F1=6 GOTO9005
9378 F1=0 SAYTH$
9379 E$=E2$ GOTO9373
9380 E$=MID$(E$,3 1)+E2$ GOTO9341
9381 E$=E2$ GOTO9005
9382 IFR$="A"THENRETURN
9383 SAYR$
9384 SAYHU$
9385 RETURN
9386 E$=RIGHT$(E$ 2)+E2$ GOTO9005
9387 E3$=RIGHT$(E$,6) E$=LEFT$(E$,2)
     F1=4 GOTO9005
9389 SAYML$
9391 F1=0 E$=E3$ IFVAL(E$)=0THEN9500
9392 E2$=RIGHT$(E$,3) E$=LEFT$(E$,3)
9393 GOTO9394
9394 GOTO9373
9420 F1=5 E3$=RIGHT$(E$,6) E$=LEFT$(E$,3)
     GOTO9005
9421 F1=0 SAYML$
9422 E$=E3$
9423 IFVAL(E$)=0THEN9500
9424 E2$=RIGHT$(E$,3) E$=LEFT$(E$,3)
9425 GOTO9373
9430 IFF2=9THEN9432
9431 RETURN
9432 SPYZ1$
9433 GOTO9500
9500 KOFF
9501 RETURN
9999 STOP
10000 C9$="NINETEEN" C8$="EIGHTEEN" C7$=
      "SEVENTEEN" C6$='SIXTEEN"
10003 C5$="FIFTEEN" C4$="FORTEEN" C3$=
      "THURTEEN  C2$="TWELVE" C1$='ELEVEN"
10005 D9$="NINETY" D8$="EIGHTY" D7$="SEVENTY"
      D6$="SIXTEE" D5$="FIFTEE"
10007 D4$="FORTEE" D3$="THURTEE" D2$="TWENTEE"
      D1$="TEN"
10009 D2$="TWENTY" D3$="THURTEE" D4$="FOURTEE"
      D5$="FIFTEE" D6$="SIXTEE'
10011 D7$='SEVENTEE' D8$="EIGHTEE" D9$=
      "NINETEE"
10017 HU$='HUNDRET" TH$="THOUSAND" ML$=
      'MILLYON"
10022 RETURN
```



Reflex skills

Continuing with Mike Williams' letter of Spectrum tips – amongst other goodies he has written a page on *Tir Ne Nog* that I'll be passing on to Adventure Corner He includes *Pokes* for games that have already been covered in the column, but there are still a fine crop of new ones for us

"If you load *Gilligan's Gold* in with a Currah Speech unit fitted it will load but crash when it starts to run. It can then be saved at a normal speed which allows you to enter these pokes for infinite lives – *Poke* 52861,0 *Poke* 52862 0 : *Poke* 52863,0 *Scuba Dive* once loaded type L or S to load/save scores than *Break* and type *Poke* 45896,0 to make your opponent's air go down quickly *Cookie* – *Poke* 26197 0 stops the bin monster throwing things (hooray!) *Firebirds* – *Poke* 24164 n where n is up to 255 *Pyramid* *Poke* 44685 0 for infinite energy *Eureka* – *Clear* 23999 *load* ""*code* : *Poke* 58117,0 *Rand Usr* 58112 to bypass the arcade sections

Booty

```
10 Border 0  Paper 0 : ink 0
20 Clear 26870
30 Load "" screen$
40 Load "" code 26880
50 Randomise Usr 26880
60 Poke 58294 0
70 Randomise Usr 52500
```

Brian Bloodaxe

```
10 Clear 64000
20 Print at 9,2, "play bloodaxe tape", at 11,9, "from the start"
30 Restore
40 For n=23296 to 23374
read a : poke n,a : next n
50 Randomise usr 23296
60 Data 6,3,197,221 33,0
70 Data 0,17 0,0,62 255
80 Data 56,205 86 5 193,16
90 Data 239 221 33,232 254,17
```

People frequently write about *Lunar Jetman* which they find Ultimate's most difficult and frustrating game. However, the high scores we get in from time to time show that there is a knack to it, indeed people have several methods to get through it John Cousins writes care of BFPO 16 "On the first stage pick up the bomb and drop it on the rover, drive or teleport to the missile base and drop the bomb on top The hardest part is dropping the bomb on to the buggy without missing and leaving huge craters everywhere – I find you can drop it on the front cab and it somehow reappears in the right place

"On harder levels, unless you and the bomb are near the base, park the rover near one teleport and move the other as far from the base as possible Return to the buggy for fuel or to avoid aliens When the missile is launched you move from the teleport and blast away The later levels have problems in the form of teleport snatching bees which dump them miles from anywhere and others that chase you all over the place I have scored 115 000 on level 15 My other high scores are *JSW* finished, *Atic Atac* 92% and 100,000, *Sabre Wulf* 91% and 109,000, *Arcadia* 600 on level 9, *Jet Pac* 650,000 (I got bored after that), *Chuckie Egg* 347,000 on level 38 and *Micro Olympics* (CBM 64) 100 metres sprint in 6 33 seconds."

Added violence

Kel Ives of Coventry has scored 114,490 on level 10 and prefers to just wait at the rover until the missile appears and go for it in mid flight He also favours putting the gun turret on the rover to bump up the score blasting aliens

My own technique for the game is to surround the rover with craters, then get in it and cringe

Brian Thompson of Beckenham has written in to say that he has finished *Pyjamarama* with 100%, which is an admirable feat but not normally still worth a mention since we have several thousand other people, but he goes on to ask when we will be reviewing the Amstrad version of *Archon* from Ariolasoft I was unfamiliar with the game but it has also been very highly recommended by Pete Gibson of Plymouth.

First the bad news – the Amstrad conversion has been delayed and certainly won't be appearing before September – it seems that they have had some problems with it (Similar reasons were given for the non-appearance of *Halls of the Things* on the Amstrad which is a shame) The good news is that *Archon* is a very playable game – well worth a look when it does arrive

Briefly it is a two player or one vs computer game where you play a wizard or sorceress who controls an army of weird creatures and spells, trying to knock hell out of the other side It is set on a sort of high-tech chess board and each of your creatures have different strengths and movement, ratings etc The fun comes from a mixture of action and strategy

Original mix

In play it is very like a game that is never far from my Spectrum – *Chaos* from Games Workshop which works on a similar principle although without the pseudo chess aspects Both represent a truly original mix between wargaming, strategy and arcade games and are a welcome change from multi-level platforms and cute sprites They are also serious contenders for the best multi player computer games you can buy, a direction that may become more and more important in the future

Games Workshop was always a promising company – its releases were always cleverly designed games, although let down at times by their programming ability Unfortunately they have withdrawn from the micro market so an Amstrad version is unlikely, but of the two, I would just pick *Chaos* as the best. It has severe flaws such as an abandon game option, but it does support up to eight players In contrast, *Archon* puts heavier emphasis on reflex skills – having chosen the creatures to put into combat you must fight it out in real time and people who aren't so hot at finger work find that even their most powerful beasts are massacred by computer controlled wimps Still both are well worth a look.

Tony Kendle

We are searching for the top UK computer games player – the best there is!

The very best of Britain's game players will get to fight it out on a number of top secret new games – scheduled for release in the autumn.

Here's how it works

Study the table below and look at the column for the machine you have – these are the games you'll need to master Send your high scores in on the form below making sure that your scores are authenticated by a responsible individual signing the form. Any score achieved using technical short cuts – such as infinite lives Pokes – will not be accepted.

Between now and September Tony Kendle will be keeping you up to date on the *Arcade Avenue* page with just who has the scores to beat. Then, in September, the top three scorers on each machine will battle it out for a place in the final and the chance to be the first to play our 'top secret' games

	Commodore	BBC	Spectrum	Amstrad
Game 1	Suicide Express	Elite	Technician Ted	Sorcery
Game 2	Beach Head	Jet Pac	3D Star Strike	Splat
Game 3	Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Game Wizard Entry Form

Micro

Game 1 score

Game 2 score

Game 3 score

Name

Address

Your signature

Witness's signature

Tony Bridge's Adventure Corner



Offers of help

Although this Corner should not be regarded as the Rubicon for adventurerers, nevertheless, it is an important part of the function. The Elf's mailbag is always full of not only pleas for help, but also offers of assistance I assume that all these good people will not mind having their names and addresses mentioned here

First of all, Hugh Walker You've seen his name mentioned many times here, and he is always willing to help other adventurerers If you write to him (including a SAE of course for a reply), his answer is sure to be as interesting as the adventure itself – he is very knowledgable on most of the good Spectrum games 7 Burnet Avenue, Burpham, Guildford GU1 1YD

Nick Carter is a very keen adventurer and would be very happy to help others with problems in *Mysterious Adventures, Lords of Time, Return to Eden, Erik the Viking, Emerald Isle, Heroes of Karn* wall a lot anyway, you get the picture! His address is 5 Canberra Towers, Southampton SO2 9JT Freddie Still has solved *Valkyrie 17, Hobbit, Urban Upstart* and *Ghost Town* 2 School House, Wellclose Square, London E1, Andrew Hall offers help to BBC-ers in *Lords of Time Colditz, Castle of Riddles, Philosphers Quest, Sphinx* and some of *Twin Kingdom Valley* 4 Warwick Crescent, Rochester, Kent ME1 3LF

If you have done some of *TKV*, you could probably help Andrew on his way – in fact, I always find that two or more players can crack an adventure in pretty short order which is a very good (maybe the best) reason for corresponding with other adventurerers Bridget Ankers has managed to solve the whole of *TKV* and so offers help to others less fortunate 27 Holt Drive, Honley Estate, Matlock, Derbyshire DE4 3BB

Alison Richards, another BBC owner, has a large selection of games, so write to her for help 112 Stockley Road, Barmston, Washington, Tyne and Wear NE38 8EQ

John Wilson has sent me many interesting notes and observations about Spectrum adventures over the months (years!), notes which amount to yards and yards of print. While he has not specifically given his permission for mentioning his address, I hope he won't mind me doing just that, as he always has interesting comments to make 26 Spotland Tops, Cutgate Rochdale, Lancs OL12 7NX

Scott Graham, appropriately, lives up in Scotland and has completed, among others, *Knight Quest* ("Probably one of the hardest I've played, and I include Level 9's"), *Lords of Midnight* and *Doomdark's Revenge* as well as *Valhalla*.

He is offering maps of the *Doomdark* series at £1 each, a practice I don't particularly approve of, but you can negotiate with him (and the phrase you need in *Emerald Isle*, Scott, is rather obscurely, Push Ceiling) 'Sirius', Mill Loch, Lochmaben, Dumfrieshire, DG11 1QA. Another Scot is Euan Terras who offers his help in the Level 9s, *Sherlock, Urban Upstart, Hampstead* and so on. 9 Leslie Terrace Prestwick, Ayrshire

Help in return

While some adventurers are willing to give help they would have also like some help in return Richard and Marie Hawkins are happy to help with *Eureka! Funhouse Snowball, Ground Zero, Gremlins* and so on but they are also having terrible problems with *Sherlock* and *Kentilla* If you can help them, or need them to help you, write to. 18 Chariot Wood Drive, Sheffield S8 7TR. *Lords of Time* is one of the most popular and enduring of Level 9's games (where's the follow up, Sue?), and one of the many readers offering help in the adventure is Adam Jackson of 8 Mintern Close, Hedge Lane, Palmers Green, London N13 5SX

Stuart *Lorimor* (*Thornslayer*) wishes to exchange views with other adventurers about *Eureka!* as well as games like *Mountains of Ket* and the Middle Earth series from Level 9 and so on. 82 Devonshire Road, Aberdeen AB1 6XG

Gary Candido has written several times to me, and I've mentioned his name before, but maybe not his address He offers help on the usual range of Spectrum adventures (*Hobbit, Twin Kingdom Valley, Valhalla, Tombs of Xeops, The Pen and the Dark*) 218 Brettell Lane, Amblecote, Stowbridge

Mnre patience

West Midlands DY8 4BC Richard Brown also offers help with the usual range, but has also finished *Bored of the Rings* He found it rather easy (or at least, not as difficult as he would have liked), and rather inconsistent – in short, not the minor classic that the Grand Elf thought it was However, he did have some kind thoughts about it, so if you want to share them, write to him at 58 Garth Heads, Quayside, Newcastle NE1 2JE.

Yet another helper for *Eureka!* – this is Ian Sumter, who says, "I don't think it's fair how you always take the mickey out of *Eureka!* It is a good adventure game, and I give it a rating of 9/10" I'm not *always* taking the mickey out of it Ian though I still find it almost unplayable However, I realise that other people have more patience than I, and some of the problems are quite nice, I admit Incidentally, the Dog (or Cod?) Latin in the Roman adventure was well spotted by you, and I agree with you about the carelessness in presentation. I'm afraid that I don't have room here for your excellent clues for this program – if readers would like some help, write to Ian at 10 All Saints Road, Chelmsford, Essex CM1 5HJ

From a bit further away, Malcolm Schmidt offers help in several Commodore adventures, including the *Zork* series, lots of other Infocom games *System 15000, Sherlock Holmes, Will o' the Wisp, Voodoo Castle* and the Level 9s His problem is that he lives in South Africa, so finds it difficult to meet other adventurers If you'd like to converse with him, his address is. PO Box 1270, Kelvin 2054, South Africa.

I could mention dozens more adventurers who have offered their help to others – as I've said before, interaction of this sort is one of the most interesting things about this hobby of ours Next week, I shall mention some of the readers who are asking for help along with some hints and clues for various adventurers.

It would be well worth remembering, however, that most software houses will, if asked, give clues to their adventures Don't be surprised, though, if you are asked to furnish some proof of your purchase of the game

Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair – help is at hand

Fill in the coupon explaining your problem send it to us and a fellow adventurer may be able to help

Remember – the system only works if those adventurers who have solved the puzzles get in touch Every week is Save An Adventurer Today (SAAT) week!

Adventure .... on (Micro) ....

Problem ....

....

Name ....

Address ....

....

Peek & Poke



Basic interpreter

Jonathan Dale of Codnor, Derbyshire writes:

Q I have a Vic 20 and am thinking of buying a Commodore 64. The literature says that the C64 has 38K of useable Ram with the Basic interpreter and 54K without it. What is this 'Basic interpreter'?

A The Basic interpreter is used to execute Basic statements (or programs). What Commodore are saying is that if you want to run Basic programs you can use up to 38K of memory (the C64 needs the rest for itself to support the interpreter), but if you are going to run machine-code programs you can utilise up to 54K of the memory as the space reserved for Basic in the Ram is no longer required.

Machine-code assembler

Stephen Heath of Derby writes:

Q I own a 48K Spectrum and would like your advice on a good machine-code assembler for under £20. Also, do compilers convert all Basic to machine code?

A The Picturesque assembler is one of the best available and together with the monitor package also marketed by Picturesque make a major impact on machine code program development.

As to the compiler question the answer is usually no. You can check out what kinds of restrictions there are as normally these are clearly stated in the instruction booklets that come with the compilers.

The *Blast* compiler from Oxford Computer Systems claims, however, to handle all Basic commands, including strings.

Oxford Computer Systems can be contacted at Hensington Road, Woodstock, Oxford (0993 812700).

Software shortage

Matthew Dowse, of Stainforth, South Yorkshire, writes:

Q I own an Aquarius home computer, which, although Z80 processor-based, suffers from a shortage of software.

I would like to know whether a machine-code program for another Z80 computer (say the Spectrum) would run on my machine?

A Unfortunately not. There are a number of reasons for this. Most importantly the layout of the Ram and Rom in the two machines is totally different. Also, the difference in memory size make it impossible. The Spectrum has a 48K Ram, your Aquarius has considerably less.

Loading problems

H A Manasseh, of Eton, Windsor, writes:

Q I own a BBC Model B – one of the very first models – and I am having difficulty loading most of the recent programs. It loads and displays the first screen and then just displays 'Bad Program'.

A Your problem is that you have an old version of the BBC operating system. To overcome this you need to get your machine up graded with the latest OS. This can be done by your dealer — almost while you wait.

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DIARY

Event	Dates	Venue	Admission	Organisers
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Personal Computer World Show	September 4-8	Olympia London	£2.00	Montbuild 01-486 1951
Electron and BBC Micro User Show	September 27-28 10.00am-6.00pm September 29 10.00am-4.00pm	UMIST Manchester	£2.50 adults £1.50 children	Database Publications 061-456 8383
Amstrad User Exhibition	October 8-8 10.00am-6.00pm	Novotel Hammersmith	£2.90 adults £1.90 children (in advance)	Computer Marketplace 01 930 1612

WANTED Atari 810 disc drive with some software will pay up to £100 Tel Penzance 64838 between 6-7pm

SWAP my Acorn Electron with software books and Electron Users for your Spectrum Plus or even a Commodore 64 Anybody! Tel Derek South Shields 551480 We love Jack Tramiel!!!!!

SWAP QL ZKUL or Typing Tutor for DP Sprite generator or Zapper or Archivist or Backgammon or any good football pools prog Tel Adrian on 0934 697091

AMSTRAD pen pal wanted home or abroad to swap ideas and tips Write to N Hart 30 York Rd Montpelier Bristol BS6 5QF

EXCHANGE Korg SAS 20 keyboard stand cartridges etc Cost £600 Wanted BBC system or WHY? 01 908 1480

BROTHER HR 5 boxed with paper and ribbons Centronics interface under guarantee Will accept first offer of £120 D Pegler The Cricketers East End Road Bradwell on Sea, Southminster, Essex CM0 7PT

WANTED for Oric Atmos 48K 1) Oric Microdisc system 2) Oric or compatible modem for Prestel and bulletin board use Call lan on Rugby 2082 with details

SWAP Seikosha 700-a colour printer for bi-directional NLQ matrix printer with Centronics and serial ports. Immaculate condition Tel Lowestoft 0502 518825 Or sell £220

SWAP DKtronics speech for Amstrad computer for Pascal and an assembler monitor for Amstrad Tel Mansfield 558823

SWAP electric bass guitar (three months old) for 16K memory expansion and printer for a Vic 20 Tel Ray Swan ey 66485

SPECTRUM DKtronics keyboard Joystick 10 games books tape recorder Swap for Amstrad Commodore with cash adjustment or 140 pound notes Farnborough 57134 (Kent)

WANTED Amstrad CPC 664 colour Will exchange with colour CPC 464 and £130 negotiable Includes many games books magazines joystick (Quickshot) Tasword Devpac Knightlore etc M Syn 6 Ibis Lane Chiswick W4 3UP 01 995 8522

WANTED ZX81 no leads, power supply manual Good condition Will pay £20 Write Jim Moore Delphi Greece GR 33054

WANTED Jupiter Ace and software no leads etc Good condition Will pay £40 Please write to Jim Moore Delphi Greece GR 33054

STUDENT would like your old neglected computer Please write giving details and cost to Dilip Hirani 58 Honeywell Lane Oldham Lancs OL8 2AA

WANTED Someone with whom to exchange ideas and hardware for the Amstrad computer possible computer only Tel Mansfield 556823 (Colin) anytime

WANTED Sharp MZ80K, 48K with disc drive printer (optional) Contact 06065 51461 ask for Mr Pearson

WANTED Interface I may consider one with microdrive or with non-working microdrive must be very reasonable due to limited amount of cash or swap and cash Tel 0643 68522 evenings

JUPITER ACE wanted complete with leads manual and 16K ram pack Contact Cpl Fahey MDSS TPMH RAF Akrotiri BFPO 57

Amstrad for Sale

AMSTRAD disc drive [illegible] system disc as new £150 ono Also Amstrad software Tel 0745 32668

COLOUR AMSTRAD perfect condition boxed as new still under guarantee including joystick and £400 software Sorcery Alien 8 Combat Lynx Pyjamarama, Ghostbusters Rellabal etc + mags Only £330 ono Tel Halifax 41074

AMSTRAD CPC 464 colour monitor 8 mths old perfect condition Want to upgrade to CPC 664 so £230 (no offers) Tel (0262) 67418 anytime

AMSTRAD CPC 464 colour monitor 3" disc drive Seikosha GP 80A printer Protek modem Interface Over 170 programs 80% on disc joystick Only £750 Tel 0565 72175 ask for David

AMSTRAD CPC 664 with colour monitor and manual Various software Hardly used 81 I board Forced to sell so only £240 01-337 1188

AMSTRAD CPC 664 with software and discs worth over £500 plus Spectrum 48K keyboard synthesizer joystick Interface II over £200 software books and magazines The lot £500 will split Tel Joli - 01 524 3805

AMSTRAD 664 green screen joystick £150 software £180 Disc drive + interface I 2 discs £155 Tel 01-337 4586

AMSTRAD CPC 664 complete system computer colour monitor disc drive speech synthesizer light pen maxam rom dust covers books mags + software value £970 sell for £475 Tel 01 743 3937

AMSTRAD disc drive twelve weeks old hardly used complete with three blank discs boxed £178 Also Amstrad software £3.50 each Tel 0630 57129

AMSTRAD 464 and colour monitor Quickshot II Centronics lead headphones software book on Z80 manual etc etc. In original boxes and good condition Bargain at £400 ono Tel Halesworth 2689

AMSTRAD CPC 464 (green) firmware guide programs back plus over £95 worth of software including Sorcery Knightlore Ghostbusters Amsoft M/c Tutor Mini Office All perfect Only £216 Thanet 587858 eves

AMSTRAD complete system colour

CPC 464 disc drive Seikosha printer 200 programs 130 on disc DKtronics light pen Protek mboard + interface joystick books club printer paper + hons Only £565 Tel 0565 72175 David

ZX81s for Sale

ZX81 Ram pack [illegible] 2/30 of s/w books [illegible] Tel 01 904 1392 (A.nd) after 8pm

ZX81 64K graphics Rom DK Tronics keyboard s/w + ORS with split no offers refused Tel 0462 720080

ZX81 1K for sale Including all leads power pack manual etc boxed plus basic book, price £12 ono Tel 01-858 7420 weekends anytime or weekdays after 5pm

TWO BROKEN 16K Ram packs for ZX81 perfect condition except connections to computer need slight attention Ideal for spares repairs etc £3 each £5 the two Tel 01-858 7420 after 5pm

FORTH COMPUTER Sinclair ZX81 I the with Forth Rom (by David Husband) Memopak 16K RAM and Filesilly rubber keyboard ZX81 ROM also supplied £45 Tel Hemel Hempstead (0442) 80516

BEATEN UP "ZX81 in butchered DK Tronics case still works Plus Sinclair 16K and Memotech 64K Rampacks and software too! Buyer collects reasonable offers John Schofield Blackburn (0254) 60033 (Day) 28127 (Night)

16K ZX81 as new with Fila Sixty key board AGF programmable joystick interface learning Lab and many listings worth £100 sell for £60 Tel 0424 440641

ADVENTURE HELPLINE

Claymorgue Castle on C16 How do you get from the lab to the battlements? Cameron MacKintosh, 38 Windsor Place Conon Bridge Ross-shire IV7 8BX

Sim Sala Bim on Commodore 64 Stuck in dungeon. Mrs J Hammond, 4 Maidstone Avenue Romford Essex.

Williamsburg on C16 I can't get started S Rafferty Hayes playing Fields Redditch Road Kings Norton, Birmingham B38 8LP

The Island on Spectrum. How to pass lion site light dynamite? John Forder 21 Orchard Croft Harlow Essex CM20 3BB

System 15000 on Commodore 64 What is the code for a Rouledge and Co and the Bank Aptet MMB FR Bradford Patket 3 Thistlewood Cres cent New Addington Croydon Surrey

Sherlock on Spectrum. I can't prove Major Foulkes innocent Any other help appreciated Greg Taylor, 38 Linton Avenue Bury Lancashire

Wizard of Akyrz on Spectrum I've got the princess and the two treasures but can I get back to the castle? Carsen Meuselbach, Hamborgerstrasse 118A D-4730 Moers 1 West Germany

Sword of the Bizgs on Spectrum How can I get out of the Barrow I have the magic beans etc Peter Martin 16 Mich Karaolis Street Strovolos Nicosia Cyprus

Sphinx on Electron What do you burn to get out of the serpent, and how do you get past the ogre P Harper Old Blacksmith's Shop Barrow Green Martley Worcestershire

Perseus and Andromeda on BBC B Any help please I'm stuck can't seem to get anywhere R Dawson 41 Union Ct Otley W Yorkshire

Sherlock on Spectrum. How do I get to the scene of the crime? Scott Nelson 80 Wood Crescent Motherwell Lanarkshire Scotland.

Philosophers Quest on BBC B Any help appreciated as I can only score 18 G Ashton La Sommerleuse Rue des Cambrees Rocquaine St. Peters Guernsey

Artic Adventures on Spectrum. I've finished all seven Artic Adventures so if you need any help card on sae and I will reply Adrian Bold 15 Towersey Drive, Thame Oxon OX9 3NR

System 1500 on Spectrum Don't know how to use Selcra - have access code but cannot use Rob Sexton 131 Heol Lewis Rhiwbina, Cardiff

Valkyrie 17 on Spectrum. How do I get out of the hotel Andrew Bar 118a Kingsmead Avenue Worcester Park, Surrey

Pub Quest on C64. I can't cross the road How do I open the cabinet in the loo? Ian Hunter 26a Buxton Road Walthamstow

Return to Eden on BBC At the beginning I keep getting blasted help please Mark James 28 Whitecote Cottages Whitecote Lane Bramley Lancashire

Arrow of Death Two on BBC I can't seem to get started R Dawson 41 Union Court, Otley West Yorkshire LS21 3AS

The Fourth Protocol on Spectrum. How do you cure Thorn and what do you type in at medical security? Paul Jones 6 Primrose Way Wrexham Clwyd LL11 3AT

Fantasia Diamond on Enterprise How to cross the river or open the manhole Peter Mundin 12 Coronation Avenue Mile Oak Nr Tamworth Staffs B78 3NN

The Hobbit on C64 How do you get out of the Elf King's dungeon and through the trap door and portcullis Shaun Brogan 42 Castle Way French Street Southampton.

Spiderman on Spectrum. How do I get to Mysterio? How do I beat Electro? Where do I get paper to run presses? G Bird 31 Wolseley Street Newport, Gwent NP9 2HP

Catacombs on C64. How to get through the door at the beginning to enter the catacombs A Conway 1 Dudley Road Walton-on Thames Surrey KT12 2JT

Doomdark's Revenge on Spectrum Has anybody got a better map than the one in the booklet? James Haslam 8 Sittingbourne Avenue Bush Hill Park Enfield Middlesex EN1 2DA

Hobbit on Amstrad. How do I escape from the Goblin's Dungeon and how do I answer Gollum. Stephen Miller Oakdene Old Station Road Halesworth, Suffolk IP19 8JJ

Sherlock on Spectrum. Have solved the crimes but can't get any further Mike Shepherd 10 Linksfield Road Aberdeen

Charts

Amstrad

1	(1)	Way of the Exploding Fist	(Melbourne House)	£8.95
2	(–)	Daley Thompson's Decathlon	(Ocean)	£8.95
3	(4)	Beach-head	(Access/US Gold)	£9.95
4	(–)	Chiller	(Mastertronic)	£1.99
5	(–)	Finders Keepers	(Mastertronic)	£1.99
6	(–)	Nonterraqueous	(Mastertronic)	£1.99
7	(–)	Airwolf	(Elite)	£8.95
8	(–)	Locomotion	(Mastertronic)	£1.99
9	(3)	Dun Darach	(Gargoyle)	£9.95
10	(–)	Ghostbusters	(Activision)	£9.99

Atari

1	(2)	Mig Alley Ace	(Microprose/US Gold)	£9.95
2	(1)	Bounty Bob Strikes Back	(US Gold)	£9.95
3	(–)	Red Moon	(Level 9)	£9.95
4	(–)	Archon	(Ariolasoft)	£11.95
5	(–)	Beach-head	(US Gold)	£9.95
6	(–)	Pole Position	(US Gold)	£9.95
7	(4)	Airwolf	(Elite)	£9.95
9	(5)	Drop Zone	(Microprose/US Gold)	£9.95
9	(–)	Strip Poker	(Knightsoft)	£9.95
10	(–)	Loggit	(Imagine)	£6.95

BBC

1	(2)	Zoom	(Acornsoft)	£14.95
2	(1)	Beach-head	(Access/US Gold)	£9.95
3	(5)	Elite	(Acornsoft)	£12.95
4	(4)	Alien 8	(Ultimate)	£9.95
5	(–)	Mini Office	(Database)	£5.95
6	(15)	Knightlore	(Ultimate)	£9.95
7	(–)	Combat Lynx	(Durrell)	£8.95
8	(–)	Brian Jacks Superstars Challenge	(Martech)	£8.95
9	(–)	Magic Mushrooms	(Acornsoft)	£9.95
10	(–)	Gremlins	(Adventure International)	£9.95

Commodore 64

1	(1)	Way of the Exploding Fist	(Melbourne House)	£9.95
2	(–)	Beach-head II	(Access/US Gold)	£9.95
3	(2)	Frankie Goes to Hollywood	(Ocean)	£9.95
4	(3)	Hypersports	(Imagine)	£7.95
5	(–)	Action Biker	(Mastertronic)	£1.99
6	(–)	Kick Start	(Mastertronic)	£1.99
7	(10)	Soft Aid	(Various Artists)	£4.99
8	(–)	Dambusters	(Sydney/US Gold)	£9.95
9	(4)	Elite	(Firebird/Acornsoft)	£14.95
10	(–)	International Tennis	(Commodore)	£9.95

Spectrum

1	(1)	Frank Bruno's Boxing	(Elite)	£6.95
2	(2)	Hypersports	(Imagine)	£7.95
3	(4)	Frankie Goes to Hollywood	(Ocean)	£9.95
4	(3)	Dambusters	(Sydney/US Gold)	£9.95
5	(–)	Action Biker	(Mastertronic)	£1.99
6	(10)	Spy vs Spy	(Beyond)	£9.95
7	(7)	Soft Aid	(Various Artists)	£4.99
8	(–)	Jet Set Willy II	(Software Projects)	£7.95
9	(8)	Dynamite Dan	(Mirrorsoft)	£6.95
10	(–)	BMX Racer	(Mastertronic)	£1.99

All figures compiled by Gallup/Leisurescope

Top Twenty

1	(1)	Hypersports *(Spectrum/C64)*	Imagine
2	(4)	Frankie Goes to Hollywood *(Spectrum/C64)*	Ocean
3	(3)	Way of the Exploding Fist *(C64)*	Melbourne House
4	(2)	Frank Bruno's Boxing *(Spectrum)*	Elite
5	(15)	Dambusters *(Spectrum/C64)*	Sydney/US Gold
6	(–)	Action Biker *(Spectrum/C64)*	Mastertronic
7	(18)	Beach-head *(Spectrum/C64/BBC/Amstrad/Atari)*	Access/US Gold
8	(5)	Beach-head II *(C64)*	Access/US Gold
9	(6)	Soft Aid *(Spectrum/C64)*	Various Artists
10	(–)	BMX Racer *(Spectrum/C64/C16)*	Mastertronic
11	(–)	Jet Set Willy II *(Spectrum/C64)*	Software Projects
12	(9)	Elite *(C64/BBC/Electron)*	Firebird/Acornsoft
13	(–)	Airwolf *(Spectrum/C64/Amstrad/C16)*	Elite
14	(12)	Red Moon *(Spectrum/C64/BBC/Electron/Amstrad)*	Level 9
15	(–)	Finders Keepers *(Spectrum/C64/Amstrad/MSX)*	Mastertronic
16	(–)	Nodes of Yesod *(Spectrum/C64)*	Odin
17	(–)	Combat Lynx *(Spectrum/C64/Amstrad)*	Durrell
18	(17)	Spy vs Spy *(Spectrum/C64)*	Beyond
19	(–)	Chiller *(Spectrum/C64/Amstrad)*	Mastertronic
20	(–)	View to a Kill *(Spectrum/C64)*	Domark

Figures compiled by Gallup/Leisurescope

Readers' Chart No 39

1	(3)	Hypersports (Spectrum)	Imagine
2	(2)	Elite (C64/BBC/Electron)	Firebird/Acornsoft
3	(4)	Way of the Exploding Fist (C64)	Melbourne House
4	(1)	Soft Aid (Spectrum/C64)	Various Artists
5	(5)	Dun Darach (Spectrum/Amstrad)	Gargoyle
6	(6)	Shadowfire (Spectrum/C64)	Beyond
7	(7)	Frank Bruno's Boxing (Spectrum)	Elite
8	(–)	Knight Lore (Spectrum/BBC/Amstrad)	Ultimate
8	(9)	Dynamite Dan (Spectrum)	Mirrorsoft
10	(9)	Revs (BBC)	Acornsoft

Winning phrase No 39: "Neil explodes if he gets too happy" from Simon Owen of Rednal, Birmingham, who receives £25. Runners up include 'Hype expert flogs lead ship to Tory wet" from J Brunett of Camberley and ' Weather experts lost in fog" from T Burdis of London SW14.

Now voting on week 41 – £25 to win

Each week *Popular* is compiling its own special software top ten chart – compiled by YOU

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever – but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart published above

You can still vote in the chart without making up a slogan – but you won't be in with a chance of winning the prize

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP

Voting for Week 41 closes at 2pm on Wednesday September 4 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name .... **My top 3: Voting Week 41**

Address .... 1. ....

.... 2. ....

.... 3. ....

My phrase is: ....

New Releases

RETARDED

Fu Kung in Las Vegas is a game I first saw on the Einstein (of all places) and the Amstrad version looks much the same which is all in all a complaint since recent history shows it is possible to make Amstrad arcade games look considerably superior

Neither does the game have much by way of exciting features – in fact mostly it's like *Manic Miner* in slow motion Jumps, for example, seem to take ages as your wacky little man slowly drifts upwards and then slowly sinks back to earth The nominal plot is collecting four cards in each casino, though strangely enough these casinos are populated with funny objects bouncing things, ladders and the usual whizzo frippery

Aside from being dull, unexciting and unoriginal, the game is also technically retarded and worse than run of the mill

The only reason to buy it is if you have either a relative who was one of the programmers or a fetish for collecting absolutely every *Manic Miner* style game anyone has ever produced

Program *Fu Kung in Las Vegas*
Price *£8 95*
Micro *Amstrad*
Supplier *Amsoft*
169 Kings Road
Brentwood
Essex
CM14 4EF

FLIPPERS

Pinball Construction Set is exactly what it says it is a computer program that lets you design and then play a pinball game of your own choice

Although the original version of this game, on the Atari, was out well over a year ago it nevertheless features all the current trendy trappings of icons, a little cursor controlled hand and boxes that light up when you make a selection

It isn't just a matter of choosing flippers, bouncy things in the middle I don't known the name of, and sundry other shapes that make your ball bounce back and forth

You also choose how the ball behaves, speed gravity, etc and what sort of sound effects to include

Setting up the board is incredibly simple you simply use a little hand to shunt the shapes around and, once chosen, press the fire button to set them in place

Obviously, your chosen set up can be saved and reloaded from disc It s simple to use and is as good as your design to play – if you have a yen to play pinball on a computer this package has everything except, unfortunately, tilt.

Program *Pinball Construction Set*
Price *£14 95*
Micro *Commodore 64*
Supplier *Ariolasoft*
Asphalte House
Palace Street
London SW1

Pick of the week

OTHER WORLDS

Of all the superb graphic adventures Interceptor have released, I think *Warlord*, the latest one, is the best. The plot is considerably more inventive than the usual bundle of vicious trolls and magic keys

The story concerns the gods intervention in a bloody war between the Romans and the Celts As the hostilities escalate the gods themselves become embroiled in battle and to prevent total destruction of the world decide that a warrior from each army shall be transported to the mythical Celtic Otherworlds where magic and mythical beasts hold sway You are the Celtic champion and must escape from the Otherworld back to the real world

The graphics beautifully display the realm of ancient sites and standing stones – they represent Terry Greer's (the artist responsible for the graphics) finest hour

It's difficult, although I found that kind deeds are well rewarded and felt dead chuffed ... my elation lasted about five locations though, as I then met a warrior who refused to let me past If *Warlord* goes on like this I may even start dreaming up in funny helmets

Program *Warlord*
rice *£8 99*
Micro *Amstrad*
Supplier *Interceptor Micro s*
The Green
Tadley
Hampshire

This Week

Program	Type	Micro	Price	Supplier
Cheaps	Ad	Amstrad	£8 95	No Man s Land
Android Two	Arc	Amstrad	£7 95	Vortex
Brian Bloodaxe	Arc	Amstrad	£8 95	The Edge
Project Future	Arc	Amstrad	£9 95	Gremlin Graphics
Budget	Ut	Amstrad	£14 95	No Man s Land
CP Graph	Ut	Amstrad	£12 95	No Man s Land
File Manager	Ut	Amstrad	£12 95	No Man s Land
Warlord	ad	Amstrad	£8 95	Interceptor
Asteroids	Arc	Aquarius	£1 50	A Hodgson
Zithers	Arc	Aquarius	£2 50	A Hodgson
Organ	Ut	Aquarius	£1 50	A Hodgson
Chop Suey	Arc	Atari	£12 95	English
Stars and Planets	Ut	BBC	£7 65	Eclipse
Hit and Miss	Ed	C16	£7 99	Venturegate
Monty on the Run	Arc	Commodore 64	£9 95	Gremlin
Now Games	Arc	Commodore 64	£8 95	Virgin Games
QL Hypderdrive	Arc	QL	£14 95	English
Equate	Ed	QL	£39 95	Fl re
Codename Mat II	Arc	Spectrum	£8 95	Domark
Nightshade	Arc	Spectrum	£9 95	Ultimate
Now Games	Arc	Spectrum	£8 95	Virgin Games
Southern Belle	Arc	Spectrum	£7 95	Hewson
The Epic	Arc	Spectrum	£8 95	Turtle Software
Way of Exploding Fist	S	Spectrum	£9 95	Melbourne House
Wordfinder	S	Spectrum	£10	WD Software
Selart	Ut	Spectrum	£5	D Pritchard

Key Ad – adventure
Arc arcade
Ed – education
S strategy simulation
Ut Utility

SMARTER

We all know what a fabbo smash hit *Way of the Exploding Fist* was on the 64, don't we? Well, here is the first on the conversions – this time for the Amstrad 464 and the Spectrum version is also on the way in early September How has it fared in its transcendental journey between machines?

Naturally, sound has been the first casualty No continuous music no screams of agony as you make your various moves oh well Secondly, gone are the different backgrounds, as you make your way up to 10th Dan – cue murmers of discontent

When you get down to playing though, you probably won't mind, as the one player version is almost as fast as the Commodore in fact if anything the computer opposition is just a little bit smarter than before And the actual combat graphics are as good as ever, being a faithful reproduction of the Mark I version

I've got the odd reservation about the two player option, however Due to the fact the 464 has only one joystick port when playing two player, at least one contestant must use the keyboard – and this takes some getting used to

Still, this is an OK conversion which, no doubt will be snapped up by the waiting Amstrad punters

Program *Way of the Exploding Fist*
Price *£9 95*
Micro *Amstrad 464*
Supplier *Melbourne House Castle House Castle Yard Richmond Surrey*

TRIPLE JUMP

Summer Games II due out later this month, proves to be a more than worthy successor to last year's *Summer Games*

The American title, which will be marketed in this country by US Gold, has all the Epyx hallmarks of superb graphics and attention to detail

The eight new events are the triple jump rowing, javelin equestrian, high jump, fencing, cycling and kayaking. As with its predecessor success depends far more on precision timing, and co-ordination of a number of moves than demonic wrenching of the joystick

The graphics are astonishingly good although not as astonishing to anyone familiar with *SGI* – all the competitors retain that finely honed, athletic physique and grace even when the horse collapses and disintegrates half way round the showjumping course or the kayak remains firmly glued to the bank.

Joystick movements relate as far as possible to real life – in the cycling, speed is achieved by rotating the joystick rather than waggling while for the triple jump, a push to the right begins the hop (taking off from the right foot), to the right again for the step (right foot), left for the jump (left foot) and forwards through the air to the landing pit

Ever meticulous Epyx has included opening and closing ceremonies, and the close even has a jet packer flying around the stadium a la Los Angeles

Program *Summer Games II*
Price *£9 95*
Micro *Commodore 64*
Supplier *US Gold Unit 10 Parkway Ind Est Birmingham B7 4LY*

GOOD VALUE

If you say that the averagely entertaining text adventure takes a couple of weeks to solve, then 99p is a whole lot of entertainment for very little So is *Crystal Quest* a good adventure?

In *Crystal Quest* you must boldly go in search of three crystals using the mighty starship USS Spectrum as transport The plot unfolds both on the mighty etc etc, and down on the planet around which you are in orbit

There is really only one complaint I have about the program it has a redesigned character set, which ordinarily would be a nice touch but in fact it makes the text very difficult to read

Still, for the small amount I've been able to play of it – the adventure seems chock full of puzzles and has few wasted locations, ie, rooms that don t have any real functions but just fill up the adventure Excellent value and worth tracking down even if you have to buy it through the post (since I find it difficult to imagine many retailers taking anything this cheap)

Program *Crystal Quest*
Price *£0 99*
Micro *Spectrum*
Supplier *Central Solutions 500 Chesham House 150 Regent Street London W1R 5FA*

This Week

A Hodgson 60 Cross St Upton Pontefract, West Yorkshire WF9 1EU **D Pritchard** Solway Computers Holme Lea Liddle Terrace Silloth Nr Carlisle Cumbria **Domark**, 204 Worple Road London SW20 8PN 01 947 5624 **Eclipse** 79 Ardrossen Gardens Worcester Park Surrey KT4 7AX 01 330 3116 **English** Box 43 Manchester M60 3AD 061 835 1358 **Fiile,** Pearse road Letterkenny Co Donegal Ireland 074 23023 **Gremlin Graphic** Alpha House 10 Carver Street, Sheffield S1 4FS 0742 753423 **Hewson** 7 Grahame Close Blewbury, Oxon OX11 9OE 0235 832939 **Interceptor** Interceptor Micros Lindon House The Green Tadley Hampshire 07356 7145 **Melbourne House** 39 Milton Trading Estate Abingdon Oxon OX14 4TD 0235 835001 **No Man's Land** 110 Bis Avenue dy General Leclerc Bloc 1 93506 Pantin Cedex France (1) 840 24 31 **The Edge** 31 Maiden Lane Covent Garden London WC2E 8LH 01-240 1422 **Turtle Software** Bridge Street Mills Witney Oxon OX8 6YH 0993 2557 **Ultimate** Ultimate Play the Game Ashby de la Zouch Leicester LE6 2JV 0530 411485 **Venturegate** 17 Harold Road Leeds LS6 1PR Yorks **Virgin Games** 2-4 Vernon Yard Portobello Road London W11 2OX **Vortex** 24 Kansas Avenue Off South Langworthy Road Salford M5 2GL 061 872 4747 **WD Software** Hilltop, St Mary Jersey Channel Islands 0534 81392



Crime and punishment

It is surprising that at a time when the computer is commonly given the blame for all kinds of disaster, little or no consideration seems to have been given to how computers should be punished for their crimes.

It is, of course, a little difficult to see how, for example, the three usual arguments for custodial sentences – retribution, deterrence and rehabilitation – may be applied to the case of an erring computer, but this is really only to say that custodial sentences may not be generally appropriate in such cases.

On the other hand there is no doubt that there is in the ordinary person a very basic feeling that 'the punishment should fit the crime' and it is this feeling that may well be built on in considering the proper chastisement of computers. Built on, moreover without having to consider any of the reservations about 'cruel and unusual punishments' that inhibit the use of this principle with human beings.

Thus the computers that caused difficulties in a recent launch of the Space Shuttle could be relegated as punishment to some substantially less interesting and exciting task, a year or so booking seats on airline flights might be thought appropriate. Similarly, the Navy computer in the Falklands that decided that Exocets were friendly, because they were French, might well be given a term of service in a language laboratory.

This kind of community service punishment is probably only suitable, though, for fairly minor offences. Sentences might be scaled up to sending to Coventry (particularly appropriate for computers in distributed networks) and full sensory deprivation techniques (pulling the plug).

Ultimately, there may be a case for applying for serious fault the ancient law of deodand whereby a personal chattel that had been the cause of the death of any reasonable creature was itself to be forfeit. As late as 1842 this law was applied to a railway engine that had been in an accident (Regina v Eastern Counties Railway Co).

Although the law of deodand was abolished in England in 1846 the argument for reintroduction seems strong and it is noteworthy that A P Herbert reports in a more recent case (Haddock v Thwale, Uncommon Law 1935), a case where the Master of the Rolls ordered the destruction, on this principle, of a motor car that had injured the plaintiff.

One area where punishment of this kind is already built-in would appear to be the 'launch-on warning' computer system now being developed in the USA for defence purposes, although it may be argued that it is not altogether satisfactory to have the same retributive result arising from both function or malfunction.

Some will argue that we should instead punish the operators owners and programmers rather than the machines themselves but this is by no means a compelling argument. To begin with, it is very difficult to assign responsibility to human beings with any certainty and without the complications that we observe every day in the courts.

Moreover, there is a well-tried historical precendent for the present proposal – that of using a 'whipping boy', often of noble birth himself, whose duty it was to suffer the punishments that could not be meted out to princes.

No doubt Charles I, for instance, who benefited from such an arrangement in childhood, would have been happy to have had it extended into his adult years.

And are we not all princes to our computers?

Gwyn Mellish

Painted faces

Puzzle No 172

When Bert cleared out his workshop he found three cubical blocks of wood. 'Just the thing to saw up and make some toy building bricks for my grandson,' he remarked.

Upon measuring the blocks he found them to be all exactly cubical in shape, each measuring an exact number of inches along the edges, although they were not necessarily all the same size. It was quite an easy task for Bert to saw all of them up into one inch cubes.

Now the original large blocks had had all of their surfaces painted, and so when they were cut up there were some bricks that had one or more of their faces with paint on and others with all six faces of newly sawn wood.

In fact there were an equal number of painted and non-painted bricks. What was the smallest number of inch cubes that could have been present?

Solution to Puzzle No 167

A set of bricks arranged in piles of orders 8, 7 and 1 will contain 371 individual bricks.

```
10 FOR H=1 TO 9
20 FOR T=1 TO 9
30 FOR U=1 TO 9
40 LET N=H*H*H+T*T*T+U*U*U
50 IF N=H*100+T*10+U
   THEN PRINT H;T;U
60 NEXT U
70 NEXT T
80 NEXT H
```

The solution depends on finding a three figure number which is equal to the sum of the cubes of its digits.

This is done using the three *For/Next* loops *H*, *T*, and *U*, to represent the hundreds, tens, and units digits respectively. The sum of the cubes is calculated and compared with the number denoted by the original digits. Values that correspond are printed out.

Winner of Puzzle No 167

The winner is M Eastgate of Canley, Coventry, W Midlands who receives £10.

Rules

The closing date for Puzzle No 172 is September 25.

The Hackers

We can test that special job now Sir, -the one based on our microwave oven control system.

Good!

COMPUTER CONTROL SYSTEMS INC.

You type 1 for rare, 2 for medium-rare, & 3 for well-done.

Ok, 3 it is, let's have it a go!



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